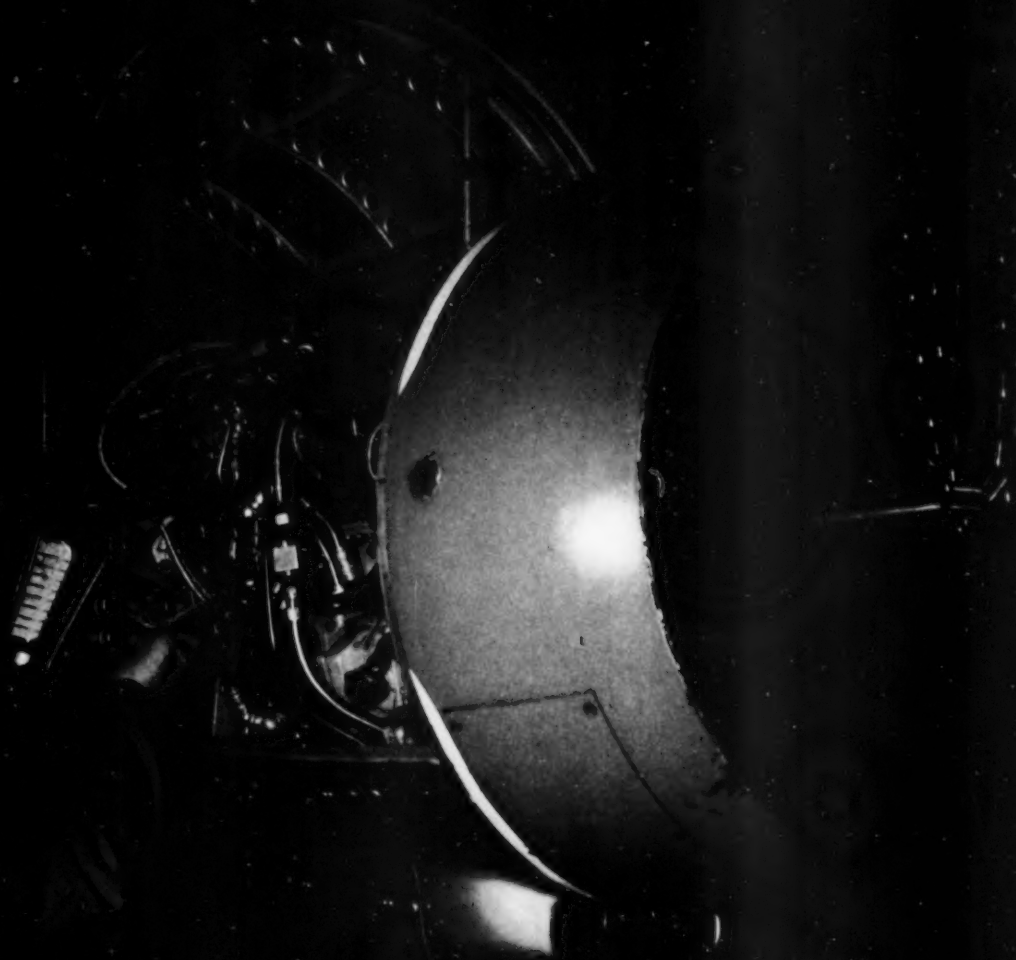


September 1951

2½ Monthly

BUSINESS



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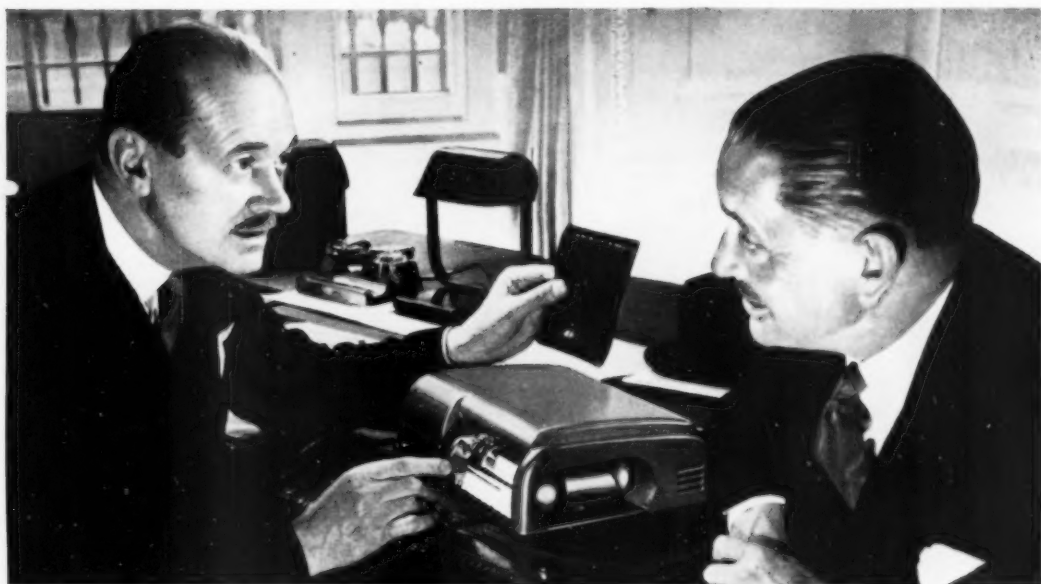
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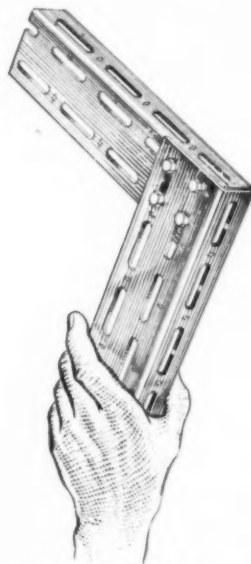
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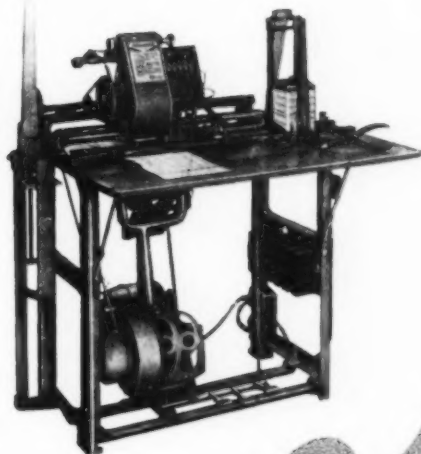
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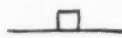
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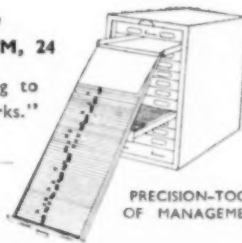
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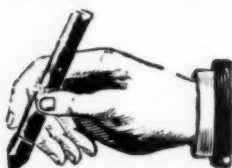
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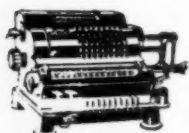


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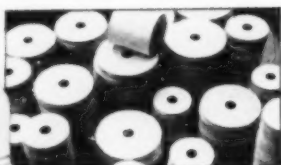
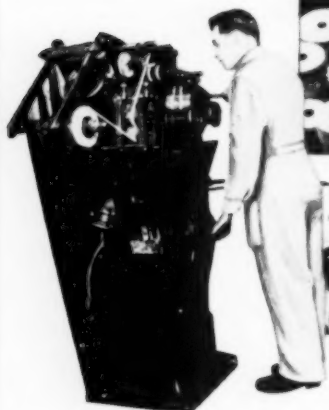
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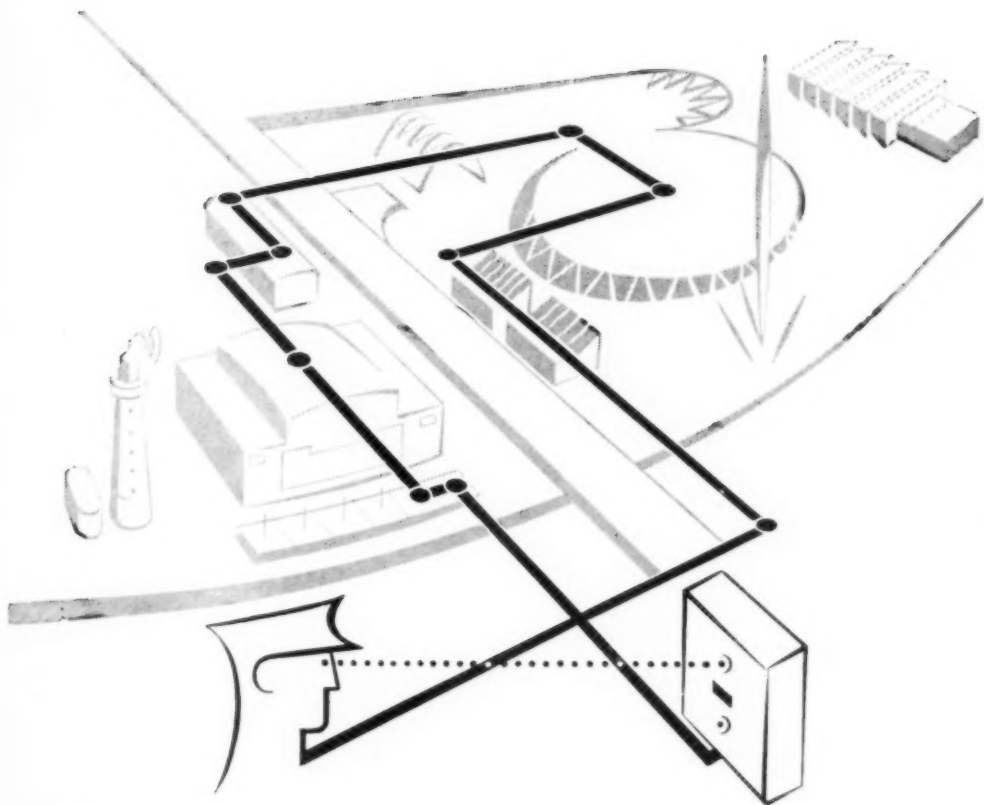
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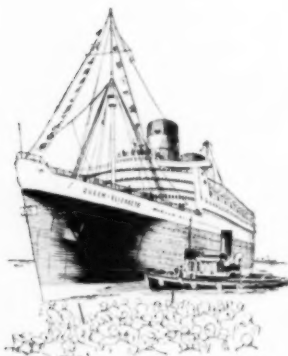
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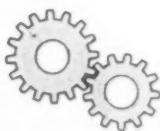
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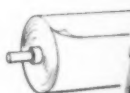
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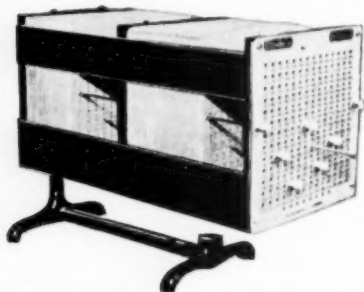
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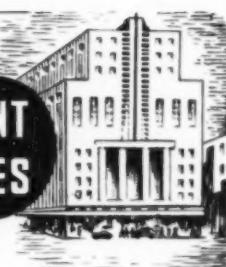
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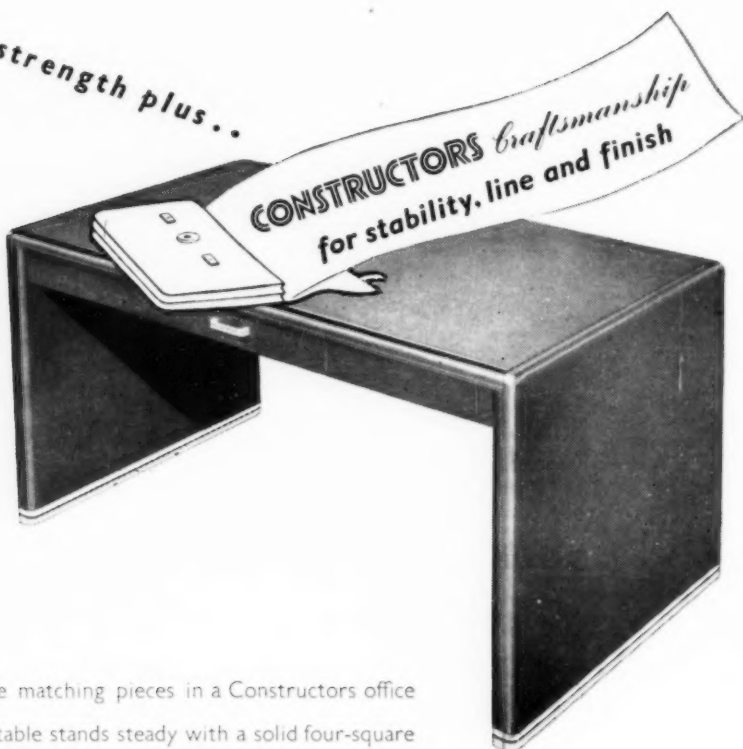
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The Journal of Management in Industry

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The MARCH of BUSINESS

CALCULATING MADAM

WITH the installation of the Manchester Automatic Digital Machine (which has of course, been christened "Madam"), at Manchester University, Britain can claim the first factory-produced high-speed electronic computer to be built in Europe, and possibly in the world. There are about ten other similar computers built or under construction in this country and about the same number in America, but these are laboratory-constructed machines intended for the use of the constructors only.

The Manchester model has been engineered by Ferranti, Ltd. from a prototype developed at Manchester university by members of the electrical engineering and mathematics departments. Two more are already under construction, one for the Army Research Establishment (who will use it to solve ballistics problems), the other "on spec." Production of a whole series of machines is envisaged.

Practical applications of these computers are so numerous that exploration of their possibilities has barely begun. The range of research work is extended in practically every science, while in industry and commerce the machines may replace many hundreds of workers engaged on routine clerical and accounting jobs.

In America, Remington Rand, Inc. are reported to have demonstrated a similar machine to cost \$600,000 or £214,000 at the official rate of exchange. Ferranti give £55,000 as a rough estimate of the cost of "Madam."

ELECTRONIC apparatus, increasingly being used in industry, has now reached the farm. A French machine being used by the British Sugar Corporation automatically "singles" beet—previously a laborious hand process.

The new machine passes along the rows of young plants and thins them out to predetermined intervals. Where, however, seed has not taken well, an electronic eye detects the gaps and limits the action of the hoe.

Another example, reported from Rhodesia, is the application of high-frequency currents to the soil just before planting. This destroys nematodes (noxious worms) in soil, water and infected plant roots.

THE PRICE OF "BUSINESS"

THE paper on which this journal is printed has more than doubled in price since June, 1949 (actual percentage increase is 140). Compared with 1939, today's price is just 10 times as great! During the past two years the costs of other printing materials—type metal, inks, composition and rubber rollers, etc.—have risen by 60 per cent., while the cost of printing has increased

since 1939 by nearly 117 per cent. The accompanying rise in the cost of fuel, electricity, transport, communications and other services must be only too well known to our readers.

The price of BUSINESS has remained unchanged for almost four years. We are now no longer able to resist the insistent pressure of the general increase in costs. Regrettably we announce that with this September issue, the price of BUSINESS is now 30/- for 12 monthly issues, post free (35/- overseas). All subscribers will, of course, have the full balance of their current subscriptions fulfilled at the old rate.

LAATEST testimony to the effectiveness of the British export drive comes from Calgary, Canada, where local newspapers were commenting that most of the souvenirs and novelties on sale during the annual Calgary "stampede" were inscribed: "Souvenir



The first factory-produced high speed electronic computer to be built in Europe, which is now installed at Manchester University.

12

REASONS WHY
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of Calgary stampede, Calgary, Alberta, Canada. Made in England." Even the traditional "10-gallon" hat worn by the Mayor during stampede week, normally made in Canada, was provided by British hatters—and was described as a "20-gallon" model.

BACK FROM BRUSSELS

THE 9th International Management Congress held at Brussels in July proved once again that when businessmen get together they rapidly get down to brass tacks. Paper shortage and printing difficulties will prevent businessmen who were unable to make the journey from enjoying the papers for some time, but BUSINESS presents a summary on page 48 of the British paper on quality control—perhaps the most concrete of all the papers read.

Highlight of the conference from the British point of view was the presentation of a gold medal by the International Committee of Scientific Management to Lt.-Col. Lyndall Urwick, vice-president of the British Institute of Management and a pioneer in modern methods of management. He is the first British recipient of this award.

Thanking the committee, Lt.-Col. Urwick suggested that the executive who tried to work fifteen hours a day, seven days a week, was of no value to his firm. In the same way, he added, we get more production from a worker working 44 hours a week than from one employed for up to 52 hours.

MOST frequent cause of motor car and lorry breakdowns is a flat battery (18.7 per cent.) with punctures (14.9 per cent.) second, according to an analysis of 73,000 breakdowns carried out by the Automobile Association. Electrical faults of all types constituted 45.7 per cent of all breakdowns.

Fuel troubles included running out of petrol (6.5 per cent.), blocked petrol feed (3.1 per cent.), carburettor (2.6 per cent.), and petrol pump (2.4 per cent.).

SEPTEMBER, 1951

SALIENT FIGURES OF THE MONTH

"BUSINESS" INDICES

	Latest Month	Month Ago	Year Ago
Production (1946=100)	* 143.1	+ 0.6	+ 10.0
Purchasing Power	do. * 110.2	+ 0.2	+ 2.0

MANPOWER

Total manufacturing industries . . . (thousands)	8,676	— 11	+ 268
Cotton spinning and weaving do.	334.0	— 0.3	+ 4.1
Coal (on colliery books) . . do.	702	— 1	+ 3
Reg. unemployed (U. K.) . . do.	214.5	— 26.2	— 93.3

PRODUCTION

Index of production (1946=100)	* 146	— 5	+ 5
Coal (average weekly output) . . (thousand tons)	4,321	+ 102	+ 197
Steel ingots and castings (do.) . . do.	+ 256	— 52	— 20
Cotton yarn (do.) . . (million lb)	* 16.62	— 1.11	— 0.89
Woven wool fabrics (do.) (million linear yards)	* 36.23	— 1.64	— 0.97
Passenger cars (do.) (thousands)	8.95	— 0.59	— 1.06
Commercial vehicles (do.) . . do.	4.69	— 0.50	— 0.37
Permanent houses completed do.	17.20	+ 1.33	— 0.91

TRADE

Value of imports (£ millions)	+ 358.9	+ 1.4	+ 133.7
Value of exports . . . do.	+ 222.2	+ 22.2	+ 39.9
Freight train traffic (million tons)	§ 5.64	+ 0.26	+ 0.21
Retail sales . . . (1947=100)	152	+ 2	+ 18

FINANCE

Currency in circulation (£ m.)	1,306	+ 11	+ 47
Deposits in London Clearing Banks . . . do.	6,167	+ 18	+ 167
Provincial cheque clearings (av. working day) . . do.	7.29	— 0.13	+ 1.06

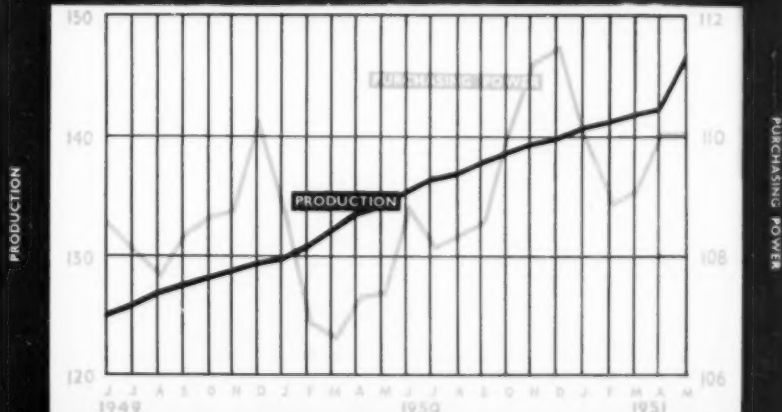
WAGES AND PRICES

Weekly wage rates (1947=100)	119	+ 1	+ 9
Retail prices (1947=100)	115	+ 1	+ 11
Wholesale prices (1930=100)	+ 320.1	— 0.9	+ 59.9
Basic materials (1949=100)	+ 189.2	— 5.2	+ 56.1
Intermediate (1930=100)	+ 370.9	— 8.1	+ £3.3
Import prices (1950=100)	+ 142	— 1	+ 43
Export prices (1950=100)	+ 122	+ 2	+ 22

§ Four weeks to June 7, 1951. *May. †July.

All other figures refer to June.

"BUSINESS" INDICES (1946=100)



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Jammed starters (3.7 per cent.) accounted for most mechanical breakdowns, with clutch and gear-box failures contributing 3.5 and 3.3 per cent. respectively. Transmission troubles numbered 3.4 per cent.

SEARCH FOR HAPPINESS

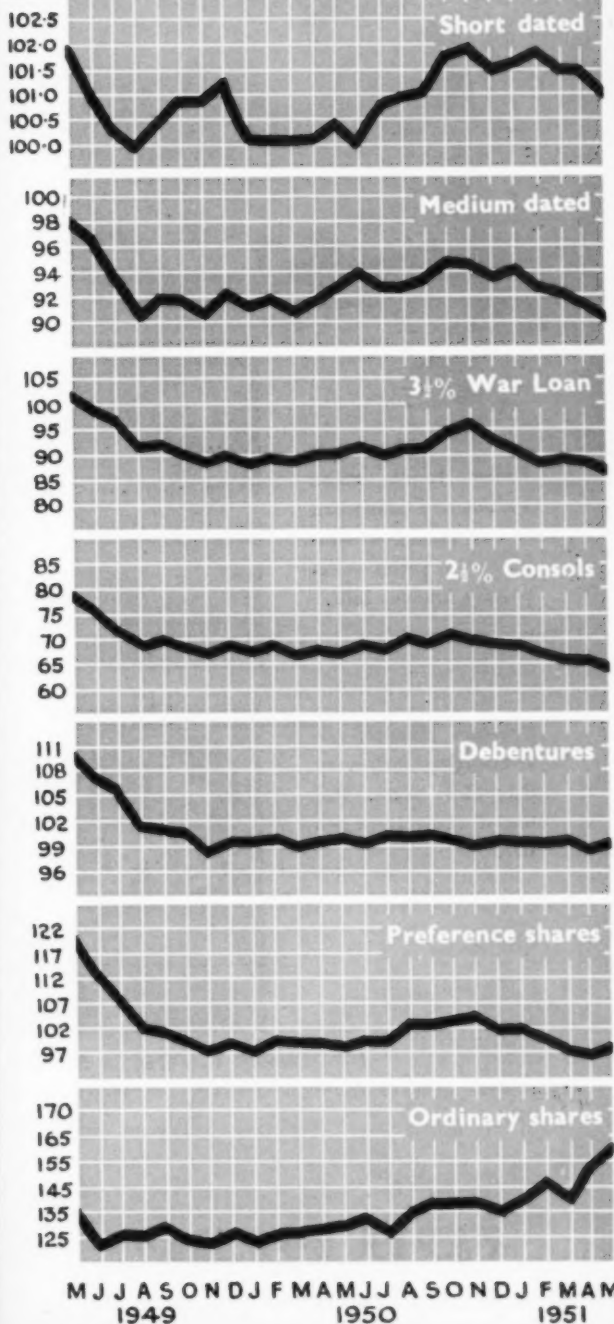
THE growing realization of the vital part played in industry by human relations, and the great contribution to output and profits that the undefinable concept of "happiness" in a "happy" shop can make has led to the emergence of yet another specialist—the personnel manager. His position today is established, though only a few years ago his role was being developed by trial and error. Some of these early errors were blatant, and their impact has not yet fully worn off.

Many an aspirant still thinks that the work of a personnel manager can be carried out by any one with a gift of the gab and a talent for mixing. Just how complex it really is may be gauged from a new book by F. C. Brook, *Personnel Management and Welfare* (Burke Publishing Co., Ltd., 21s.) to be published later this month. On the one hand, the personnel manager to-day must be *au fait* with the rapidly developing psychological techniques for the selection of personnel; on the other, he must be familiar with the complicated questions of status and working conditions that arise in negotiations with shop stewards and trade union organizers. And in between, he must take such matters as the running of a can-

HOW THE CHART IS CALCULATED

The chart is based on the figures of the Bank of England and Actuaries' Investment Index. The top four panels show average prices over the last two years of various types of British Government securities. The lower three panels show price indices (December 31st, 1938=100) of the three types of industrial securities.

Trends in Investments





How to cut absenteeism

The main cause of lost time in industry, according to the Medical Research Council, is sickness absence. Much of this absenteeism can be traced to the transmission of contagious ailments through the use of communal towels.

Roller towels mean waiting and congestion — lost hours — transmission of germs — expensive laundry bills.



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teen and the organization of industrial safety campaigns in his stride.

The literature available to help the personnel manager in his job is still very sparse, and Mr. Brook's work gives a valuable introduction to an increasingly important job. The practical note is indicated by the very large number of specimen forms and tables reproduced.

ESTABLISHMENT of a central committee consisting of representatives of railway, road transport and dock interests, manufacturers, traders, the British Standards Institution and the Armed Services to extend and standardize the use of pallets in transport is suggested in the report of a team on Freight Handling which visited the United States under the auspices of the Anglo-U.S. Productivity Council. An interesting innovation is the recommendation that nominees of the technical press should be considered as members of the committee—the Fourth Estate comes into its own.

THE COVER PHOTOGRAPH

THE cover photograph, specially taken by a BUSINESS photographer, shows final adjustments being made to a Sapphire jet engine before it is installed in a wind tunnel for final tests. The photograph was taken at the Coventry works of Armstrong-Siddeley Motors, Ltd. An article on Mr. H. T. Chapman, managing director of the company, appears on page 51.

IN the article, "King-pin of Western Rearmament," in the August issue of BUSINESS, Mr. William Herod was referred to as "head of N.A.T.O.'s Defence Production Board." Actually the chairman of the Defence Production Board is M. Henri Jannet of Belgium. Mr. Herod's title is Co-ordinator of North Atlantic Defence Production. As a consequence, M. Jannet's portrait should have replaced that of Mr. Herod in the chart of N.A.T.O.'s organization.

SEPTEMBER, 1951

A 14-Point Sales Audit Programme

All companies have an annual review of their financial policies. In an address to the recent International Advertising Conference, Mr. Fairfax Cone, Chairman of Foote, Cone & Belding, Inc., suggested that a similar annual audit should be made of marketing policies.

Every product should come up for a complete review every year. This would prevent a sales policy going on year after year for want of something better. In the annual review every element in the sales strategy would have to re-justify itself every year.

This sales audit would fall into five parts—a statement of facts, opportunities and objectives, recommendations on the statement of facts and a summary. Of these the initial statement of facts was probably the most important and should include fourteen items:—

1. The complete sales history of the product covering a number of years.
2. The history of consumer sales, giving figures of total annual sale, and more important, the share of the total market that those sales represented.
3. Price history of the product, including details of changes in size, etc.
4. History of the product itself—quality improvements, what the consumer liked about this product and what he liked about other similar products.
5. Competitors; what product was the main rival; how did it compare? How was it being marketed? Was the main opposition from one national line or a number of smaller local lines that, grouped together created a formidable opposition?
6. Was the market growing, declining, or remaining static?
7. Consumer attitudes—what did the public like about the product? How recently had there been a consumer survey? Was the product keeping pace with changes in public taste?
8. Was the sale of the product uniform in all areas; or weak in some and very strong in others?
9. What were the distribution trends?
10. The gross profit history of the business; in cash and in units.
11. The history of advertising expenditure.
12. The history of selling expenditure.
13. Advertising history—changes in policy, copy strategy, media strategy, use of premiums, competitions, etc.
14. Selling history—the number and depth of coverage by salesmen in different territories.



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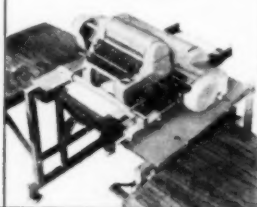
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How to Raise Capital for Immediate Needs

Rising prices mean that businessmen must find more money to finance stock, turnover and plant replacements. In this article, an outline is given of the sources from which new capital can be raised on a short-term basis. In a future issue of BUSINESS, when the capital market has recovered from the shock of dividend limitation, a further article will discuss ways of raising permanent capital for expansion.

THE business to-day that does not feel the urgent need for more finance is the exception rather than the rule. Indeed, one might almost say that there must be something radically wrong with it. We are all well nigh submerged in an inflationary situation; the cost of living—and of doing business—is constantly rising. Even to stand still, more and more money is needed to meet these rising costs. If a business does not need more money, the odds are that it is losing ground, whatever its profits may show.

The main reason for this universal demand for more money is, of course, the considerable and continuous rise in prices that has taken place during the last ten years—and seems likely to continue indefinitely. A merchanting business which, ten years ago, required a working capital of £30,000 for its operations will to-day require at least twice that amount to finance the same volume

of turnover. It may well need more, since money must be found to finance purchase tax transactions in addition to actual price changes. Moreover, shortages and violent fluctuations in the supplies of certain goods have meant that many firms have had to increase the volume of the stocks held, which has locked up still

By THE EDITOR

further working capital.

A manufacturing business which has to pay purchase tax or excise duty on its goods is in the same position, since it must normally pay the tax to the customs authorities before it has time to recover it from its customers.

The businessman's difficulties, however, are not restricted to the need for more finance to cover stocks and debts. Fixed assets have to be replaced, and the prices of these have risen just as much as

those of consumer goods. The sums set aside for depreciation are normally based on historical costs, and bear little relation to the replacement price. Even if depreciation has erred on the generous side, it is unlikely that this generosity will have been enough to cope with the very large increases in price that have actually taken place.

In past decades, the normal practice for dealing with a period of rising prices was to increase reserves from undistributed profits. The high rates of taxation in force to-day have effectively inhibited management from carrying out this practice.

To some extent, the businessman's dilemma has been met by securing longer credit terms from suppliers, so that, in fact, his business has become increasingly financed by his creditors. This is, however, an unhealthy trend. For one thing, it can only be a temporary solution. So long as prices are rising and business expanding,



there is always enough coming in to meet the current demands of the suppliers. But if and when prices begin to fall, or turnover to drop, there will come a time when the money received from debtors is no longer enough to meet the demands of creditors. Other sources must be tapped to make good the deficit, and if these are not available, the inevitable end is Carey Street.

If a business that is merely standing still needs more finance, the firm that is expanding, and wants to erect a new factory or buy additional machinery, is obviously in an even more difficult position. In this article, however, we shall restrict ourselves solely to the question of "temporary" finance, i.e., money required merely to cover current transactions, and leave consideration of "permanent" capital, required to cover expansion in terms of bricks and mortar, for a further article to be published at a later date.

First Call, the Bank

WHERE, then, is the businessman in search of fresh "temporary" capital to go? The first port of call is, and always has been, his bank that normally

handles his account, where he may seek an overdraft. The extent to which businessmen everywhere have been doing this in the last few years may be seen in the rapid rise in bank advances (the banker's euphemism for an overdraft). From a figure of £976 million in 1938, they have risen steadily to £1,793 million (June, 1951). There is a good deal of evidence to show that the bankers are getting a little frightened by this steady increase; some, at least, are currently requesting firms with long-standing overdrafts to reduce them, and are examining fresh applications for advances with a somewhat jaundiced eye. In these circumstances, it behoves the businessman contemplating a visit to his bank manager to make sure that he is presenting his case in the best possible light.

This is the more important, since he has not merely to convince his manager whom he knows and who knows him personally, of his need and ability to repay a loan. Under present banking conditions, no local manager can himself sanction an overdraft above a very nominal figure; he can only forward a recommendation, with supporting evidence, to the bank's

Loan Committee at regional or head offices, and must abide by their decision. And the Loan Committee, while paying due heed to their manager's opinion as to his client's status and reliability, will be just as interested, if not more so, in the facts and figures with which he supports his recommendation and with the nature of the security offered.

Just what facts and figures the bank will want will depend firstly on whether the businessman wants to raise the loan against the whole of the assets of his business as a going concern, or whether he is merely offering a particular asset as security for the loan. In either case, however, the bank will attach considerable importance to the reason for which the money is wanted.

Banks do not like advancing money for working capital that may be tied up for a considerable time. They favour short loans, that can be repaid within, say a year. Loans to help businesses over slack seasonal periods, enabling repayment to be made in full at the busy seasons, are the kind that banks like. Advances against firm orders for goods, delivery of which cannot be made

HOW OVERDRAFTS AND CREDITS ARE RISING

ASSETS			LIABILITIES		
	1946	1949 or 1950		1946	1949 or 1950
	£000's			£000's	
Cash	9,958	8,974	Capital	47,957	56,198
Marketable Securities ..	8,706	5,137	Reserves	33,636	58,859
Debtors and bills receivable	39,160	64,486	Bank Overdraft	13,998	30,589
Stock	44,873	90,586	Creditors and bills payable	49,662	69,415
Total of above assets ..	102,717	170,183	Total of above liabilities	145,253	215,061
Other assets (net) ..	42,536	44,678			
	145,253	215,061			

The changing situation in the capital structure of British industry is shown in the consolidated balance sheet of a sample of more than 1,500 companies published by the British Bankers' Association in a memorandum to the Royal Commission on Taxation of Profits and Income.

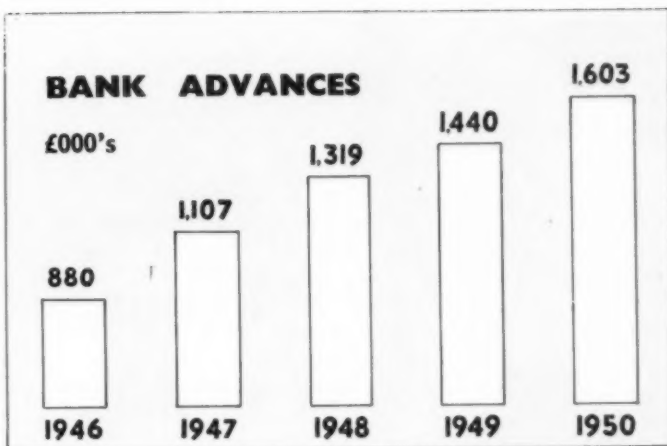
for some time, also come within this category. In normal times, banks will also find money for securing savings in costs, even where these mean spending money on more efficient machinery and equipment, improving methods, handling and distributing trade, etc. But applications for money for selling schemes, advertising or plant extensions will have little hope of being accepted.

If the loan is to be covered by the entire assets of the business, the bank will want to see profit and loss accounts for at least the past five years, and it will make a considerable difference if these have been passed by a chartered accountant. It will want to know what are the firm's biggest assets, and is interested, not in their book value, but in the value they would have if they were to be realized in the near future, should the business fail to meet its commitments. Consequently liquid assets, such as government securities, insurance policies, shares in well-known public companies, are more valuable as collateral than buildings or machinery, even though the latter may have a higher book value.

The bank, too, will keep a sharp eye on any debentures outstanding. These have first claim on assets in the event of a winding up, while ordinary and preference shares rank after a bank loan.

In the case of a limited company, the bank will usually require that the directors give a joint guarantee on the loan, and that, in addition, each director shall guarantee it personally. This precaution is taken to avoid under-hand dealing, in which the company declines while the directors grow rich. If each director signs, such activities are less likely to occur.

All this investigation will only take place when the request for an overdraft is made on the security of the entire business. If the firm wish to mortgage some particular asset, such as machinery or raw materials, then the manager will restrict his enquiries to a close determination of just what the cash value of those specific articles



Bank advances have nearly doubled in four years.

would be in the open market. If he accepts such security, he will require a general or personal guarantee to protect the bank against a heavy and unforeseeable drop in prices affecting the mortgaged article.

Even if all other factors are favourable, however, there is still the personal element. The manager will look at a balance sheet not merely to establish profits, but to study the business methods of the prospective borrower. He will be interested, for instance, on the methods used to write down buildings, plant, fixtures, etc.

Other Methods

IF an overdraft is not forthcoming, or not desired, there are a number of other methods by which temporary finance can be raised for financing current transactions. In addition to the commercial banks, there are many finance companies, such as merchant banks, acceptance houses, investment trusts, known collectively as "the City," who specialize in the provision of both short-term and long-term capital for industry.

On the short-term basis, the most familiar method adopted is the bill of exchange or acceptance credit. This has for centuries been widely

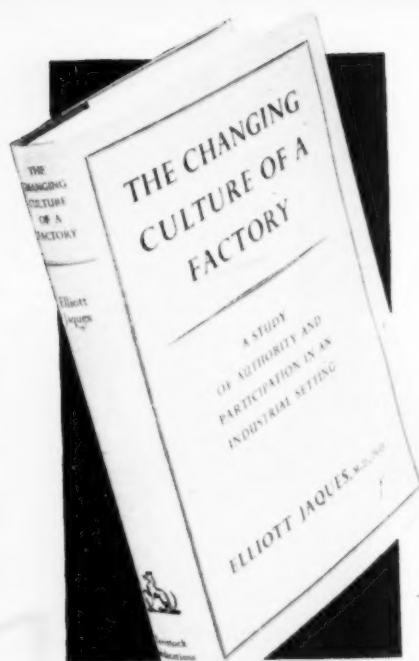
used to finance foreign trade, and was originally also used for internal trade. For many years, however, the internal use of bills fell into desuetude, but in recent years there has been a marked revival—to the benefit of all concerned.

The way in which a bill of exchange works is quite simple. Suppose a small firm, or a young firm, manages to book a large order. Its resources, however, are too slender to enable it to finance the work. The prospective customer is naturally unwilling to make a substantial advance before the goods are delivered, and the firm's assets are not large enough or are unsuitable to act as collateral against a bank advance. Suppliers will give credit, but even this is not sufficient.

By negotiating a bill of exchange, the young firm can centralize all its difficulties at the finance company's headquarters by obtaining cash (less a discount) against the order in hand. This not only allows the financing of orders that would be far beyond the scope of the new firm, but also brings immediate profit and a strengthened financial position. Indeed, it allows the handling of more than one big order at a time.

What happens is this; a firm, A,

Continued on page 113



The "two sides" bugbear has destroyed effective joint consultation in many an industry. By analysing the attitudes of all concerned and re-modelling its consultative and executive bodies to meet these needs, the Glacier Metal Co., Ltd. have welded the two sides into a single integral unit in which all participate.

From Joint Consultation to Joint Control

By RICHARD LAWRENCE

THE Glacier Metal Co., Ltd., of Alperton, Middlesex, has had a reputation for many years of being one of the most progressive firms, both from technical and managerial aspects, in the country. Founded in 1899, it developed slowly but surely from the manufacture of white metal to the production of bearings, and other engineering products, and suffered the normal trials and tribulations of an expanding engineering concern. Then came 1940. The demands of rearmament and the advent of a new managing director together gave a tremendous impetus to Glacier's development. Major advances were, in particular, made in the field of labour relations. New and generous payment systems, a new personnel and welfare department, and a comprehensive system of joint consultation followed quickly. A rapid expansion took place and to-day the firm employ 1,800 workers at Alperton and a further 400 in a Scottish factory.

Thus when, in 1946, the Tavistock Institute of Human Relations were looking for a firm that would

co-operate in a programme of research, their thoughts naturally turned to Glacier Metal. There had already been sporadic contacts between members of both organizations. A formal approach was made, and in due course, the consent of both the management and the workers of the firm was obtained to the introduction of a research team.

At the outset, not even the research workers themselves had a very clear idea as to what they were going to do. They were looking for problems in human relations which they might help to solve, but to find what problems there were in Glacier demanded a greater knowledge of the firm than they, as outsiders, possessed.

The first stage of the research work was thus spent in a general survey of the way in which the firm was organized and operated, and second, in establishing the position of the team. The team consisted of eight scientists—sociologists, psychologists, economists. Their qualifications were not, however, purely academic; one had been a coal miner for 18

years, four others had been full-time trade union officials, and all had had experience in industry on the shop floor. This fact stood them in good stead in their efforts to gain acceptance from workers who had opposed or only accepted the decision of the Works Committee to allow them in.

So, too, did the deliberate policy of independence which the team adopted from the beginning. The team reported to the works council, the joint consultative organization and to no one else; they went out of their way to demonstrate that they were not concerned in supporting any one group against another—so much so that individual members of the team refused all social contacts whatever with members of the firm.

It was this necessity of emphasizing the team's independence that finally shaped its programme, since it was decided that the team would not investigate any problem except those willingly referred to them by the departments concerned. The team had three ideas only on these problems; (1)

no problem referred to them would be as simple as it seemed; (2) no solution would be simple; and (3) every problem solved would inevitably provide other problems for which solutions must be found.

They were right. In the final result, a programme that started with an apparently simple deadlock in one small department as to the exact amount of a day-rate payment led, step by step to a complete reconstruction of the entire organizational framework of the firm, involving the final establishment of a joint council of all grades of worker as the central policy-making body of the firm.

A full report,¹ of this transition by the leader of the research team concerned has just been published; it is certainly the most important document on management-labour relations that has been published in this country for many years.

During the initial period, when they were waiting for problems, the research team carried out a general survey of the background against which they were working, largely from the historical point of view. In due course, two problems were referred to them almost simultaneously; one by management, which asked them to look into the conduct of the regular divisional managers' meetings, and one by mutual consent of management and workers from the service department, which had run into difficulties in negotiating a wage change. Of these the latter gave the more immediate result.

The service department is a small department of some 100 workers, engaged in maintenance, repair and small jobbing work of various types. In 1943, a system of payment by results had been introduced, but this had not worked well. When in 1948 the divisional manager suggested going back to day rate, there was general agreement in principle.

A joint wages committee was set up to negotiate details, but immediately ran into snags, and a mem-

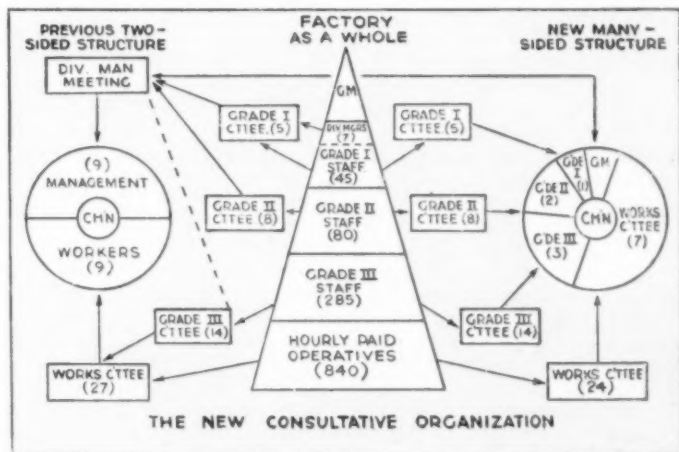
ber of the research team was invited in to help. He found that the immediate stumbling block was not so much a disagreement on wages, as the shop committee's fear that management was "putting something over" on them. On the consultant's suggestion, meetings were arranged between shop committee men and all the workers affected, in groups of eight, to get a better light on the attitude of the men. These, in turn, revealed suspicion on the shop floor that the committee were "management stooges." Most of the men agreed to the change, but had unresolved doubts on safeguards and guarantees. Morale problems kept creeping in, in spite of the workers' attempt to restrict discussions. At a later meeting, the supervisors were brought in, and a further source of friction emerged. But the very fact that these sources of friction were brought out into the open and faced up to meant that many of them, based largely on misunderstanding and ignorance, could be resolved.

So far did this resolution go that, at a later meeting, the divisional manager could suggest the formation of a completely new body, a shop council, on which management, supervisors and workers were all represented, to carry through the introduction of the new method of payment and

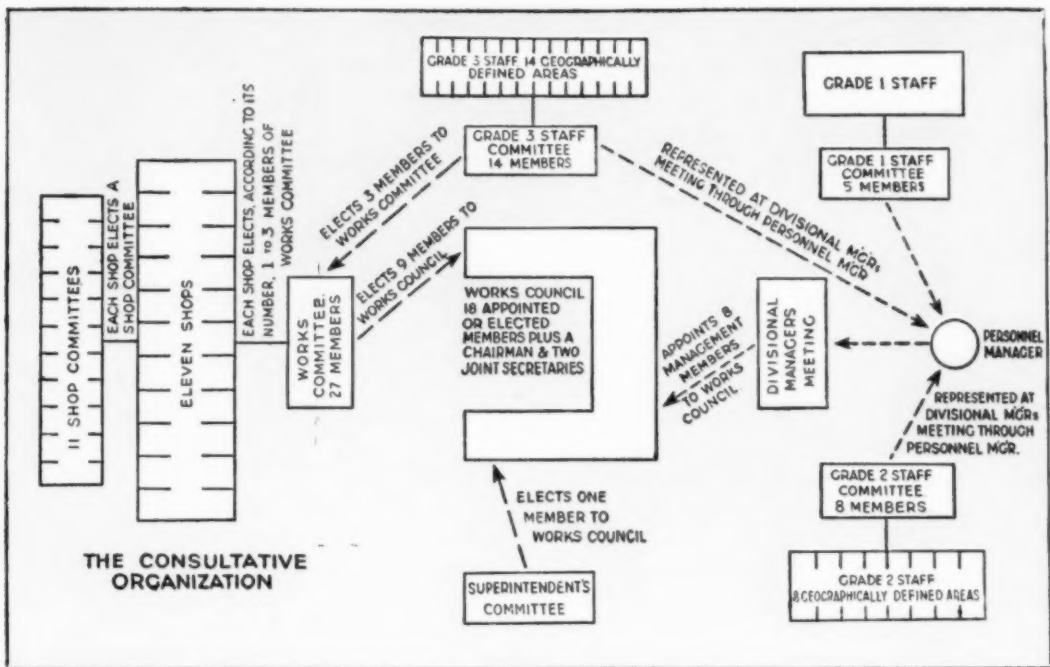
stay in being as a constant nucleus for the solution of similar problems as they occurred. After protracted discussions and a good deal of heartburning, the new council was in fact set up, and has formed a prototype for a larger organization covering the company as a whole.

The company's works council in 1949 consisted of 18 members, plus a chairman and secretary, meeting once a month. Its members were involved in a considerable amount of work, and yet did not—at least to some of them—appear to accomplish much. They therefore asked the research team for help, in getting more out of their meetings, and also asked them to resolve unsolved questions of joint consultation such as the shop stewards' question, the problem of staff and supervisors' representation and so on. Those responsible, however, rather boggled at such an ambitious programme, and it was finally decided to concentrate on two aspects and extend the investigation as opportunity arose.

Initially, discussions concentrated on the procedure of meetings, and particularly on the possibility of forming standing committees to expedite them. These, however, immediately revealed, firstly, a considerable degree of confusion among members of the council as to just what the council did or should do, and secondly



¹"The Changing Culture of a Factory," by Elliott Jaques, Pp. xviii.—341. Tavistock Publications, Ltd., 28s.



the same sort of suspicions as had arisen in the discussions in the service department.

To iron out these differences, the entire council, together with members of the team, retired to a training centre near London for a week-end conference to consider an interim report of the research team.

After a bad start, a remarkable amount of agreement was reached; the standing committees became a reality and other steps were taken to improve the work of the council. Further research was inaugurated into the lack of channels of communication between the council and its constituents. It was found that the channels were there, but that every one was afraid to use them. As a result of this study, the whole structure of the works council was changed from the orthodox two-sided works divisional council to a multi-sided council composed of representatives of all strata in the factory, and this new council became the central policy-making body of the whole firm.

The investigation into communication threw some limelight on the activities of the works committee, which was responsible for appointing the workers' representatives on the works council. A representative of the team had been attending works committee meetings for some time, and from his experience, plus the findings of interviews held with members during the communications survey, a report was circulated to the committee. This report stated bluntly that there was a block in communications between the works committee and its representatives on the works council, which in turn resulted in the works committee acting as a serious block in communications between the works council and the shop floor.

The subsequent discussions on this report were aggravated by the fact that serious changes were concurrently taking place in the structure of the works council, in particular, a decision that in future membership of the works committee should be limited to shop stewards. This brought up

again the vexed question of the relationship between union and non-union members, and between the loyalties of committee members to their colleagues and to the trade union movement outside the factory. It also raised the important question of whether members of the committee were delegates or representatives of their constituents. On paper, this has been resolved in favour of representation, but the difficulty is not one of definition but of action. How does one prevent committee members from falling back, in face of difficulties, into the role of delegate?

Glacier do not pretend to have solved these problems, and it is still too early to say what effect the new consultation structure will have upon them. But at least the problems are out in the open, and recognised by all concerned.

Another link in the joint consultation machinery was the superintendent's committee. This had evolved from a foremen's committee set up in the Works Division in 1940, and subsequently en-

larged to include executives at different levels from other divisions. The committee called in the research team because they felt frustrated by lack of guidance on policy from top management and an inability to agree among themselves. The team's representative, however, diagnosed the real difficulties as a lack of common interest, since the composition of the committee did not represent any coherent section of the organization, and a lack of two-way communication within each of the divisions. Contributory factors were antagonisms between technical and administrative staff, and the anomalous position of the committee's representative on the works council, where he was the only member of management not appointed by the managing director.

As a result of discussions on this report, the constitution of the committee was recast, but the revised version represented a compromise between conflicting views, and worked little better than the old. In the meantime, a new works manager was appointed, and he announced his intention of setting up regular meetings between himself and his subordinates. Partly as a result of this, and partly owing to the change in

the constitution of the works council, the superintendents committee agreed to dissolve. The works manager's meetings give the two-way communication within the largest division of the company, while the new council solves the major problems of superintendents in other divisions.

The final activity in which the Institute's research team took part was the divisional managers' meeting.† This was a regular weekly business meeting between the managing director and his eight divisional managers, four of whom were also directors of the company. While the meetings were, in general, highly successful from the operational point of view, and morale was high, there were certain indications of tensions, many of them a hang-over from pre-war days.

Thus when the new works council was being discussed, the managing director innocently suggested that the meeting might consider the question of final power and authority for policy in the firm. This led to the generation of so much heat that it was decided to hold a series of special evening meetings to discuss the relationships among themselves, and to ask the research team to help. A series of meetings was held, but

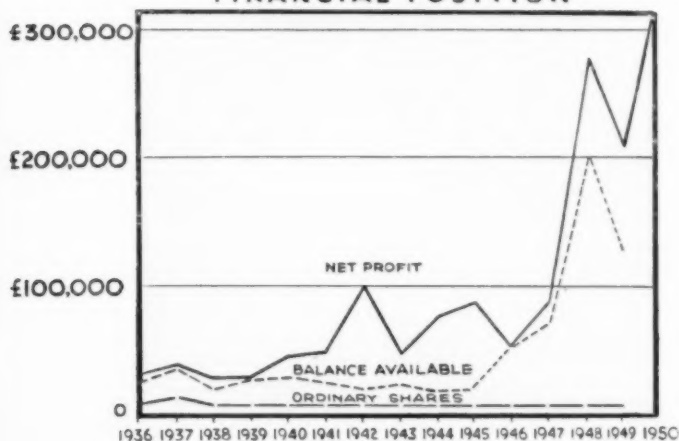
petered out without any decision or action being taken. The detailed account of these meetings, and the analysis of their apparent failure, makes fascinating reading. The discussions, though immediately abortive, had, however, a considerable effect on the conduct of regular meetings, which, in addition to their normal work, were tackling the problem of working out a written statement of company policy and a series of management standing orders prescribing attitudes and action to be taken in certain circumstances.

Their effect, moreover, has more recently been shown in a decision to hold a further series of evening meetings.

Thus what started as a tentative and somewhat nebulous investigation into human relations has led, within the short space of thirty months, to a complete reorganization of the management structure of the firm. The orthodox joint consultation system has been scrapped, and a new system evolved to meet the needs of those concerned; the pattern may well prove the effective method of finally breaking down the "two-side" bugbear that has so effectively dominated human relations in the past.

In particular, a clear distinction has been made between consultative and executive responsibility, a distinction that is laid down in a written statement of company policy. There is thus an executive system extending continuously from managing director to shop floor, whose authority is based on a known policy forged within the factory and therefore indigenous to it. Sanctioning the executive procedures is the new consultative set-up in which policy governing executive action is hammered out. The general manager's monthly report provides the main link between the two factory-wide consultative and executive set-ups. The management, by bringing a regular report on its work, leaves itself open to criticism and to challenge on policy, but also receives constantly renewed sanction for its work from all sections.

FINANCIAL POSITION



Enterprise in new management methods pays off in increased profits.

Quality Control as a Tool of Management

By PHILIP F. DYER

Quality control is no mystic rite but a tool of management that has many uses in industry. It is a means of measuring and controlling such things as costs, machine utilization, productivity, labour turnover, accidents and other variables.

Its applicability to diverse industries is shown in this article, condensed from a paper read by Mr. D. J. Desmond to the International Management Congress at Brussels, which includes examples ranging from aircraft components to chocolate bars. With the increased use of quality control has come a new personality in the factory—that of the quality control engineer.

THE salient characteristic of modern management is its insistence on facts rather than intuition as a basis for decisions. The businessman to-day can no longer afford to play a hunch. To get at the crucial facts, however, means measuring past performance and comparing current performance with a standard of some sort. Measurement means figures. But figures baffle the man on the shop floor and too often get the better of management. Hence was born the quality control chart, which translates the mathematics of the actuary into a simple form that can be used by any worker with sufficient intelligence to fill in a football coupon.

During the last war, hundreds of engineering firms used quality control charts for routine inspection work. After the war, many of them dropped the new technique. Nevertheless, the use of quality control spread. Other industries outside engineering started using it. Moreover, some firms went on to use the technique, not merely for routine inspection of machine output, but in measuring and hence controlling, such things as costs, machine utiliza-

tion, productivity, labour turnover, accidents and other variables. And it is significant that very few of the firms who adopted quality control as a tool of management, rather than a mere inspection technique, have subsequently abandoned its use.



BRICKS
Quality control charts enable the firm to produce a more uniform product by providing data for determining the causes in variation in quality.

In many of the new industries using quality control, the charts started as a laboratory tool. A firm making building bricks in very large quantities, for instance, installed quality control charts in the laboratory for routine analysis work. Now these charts are used for systematic inspection on the shop floor. They provide data for determining the causes of variation in quality.

Since the firm started using quality control they have found

that much of the variation in the dimensions of their bricks occurs from different firings, and they have now been able to correlate this variation with differences which occur along the clay deposits. This enables them to predict the results which will be obtained from a study of the raw material and so make the necessary adjustments to the process in advance to achieve a more uniform product.

Similarly, quality control has been used successfully in pottery making. This is generally considered to be one of the old-fashioned craft industries, in which the operative has been able to exercise his skill in counteracting the effect of changes in the properties of the raw material. The need for greater productivity and the inability to replace skilled craftsmen with the same type of personnel has required strict control over the material. This has been achieved with the aid of quality control, and has enabled the firms using this technique to make use of more semi-automatic machinery. In addition, control charts are used in a large shop where the pottery is decorated; the method used consists of giving a score to each fault found on an article and adding these scores to assess the total "demerits" in the sample. This total is plotted on a control chart with the appropriate control limits. This has increased the proportion of first grade articles.

VALVES

Bonus paid to workers is determined by using a quality control scheme. Results have shown a better product is being made.

Other industries have also been influenced by the use of more automatic machinery which has the effect of increasing the rate of production. One firm making thermionic valves has paid a quality bonus to its workers for some years. The greatly increased out-

put obtainable with its new plant cannot be assessed sufficiently rapidly with the old inspection methods, so a quality control scheme has been established with the primary object of determining the quality for the purposes of this bonus.

CONFECTIONERY

Use of quality control to determine variability of weight of 2 oz. chocolate blocks has reduced average overweight by about two thirds and avoided a price increase.

The problem of "packaging" occurs in nearly every industry and in many cases quality control methods have been used to effect an economic solution. The problem cropped up during the war in the manufacture of cakes, when the Ministry of Food insisted that they must be sold by weight. It became necessary for each packet to contain at least the stated weight, and waste could then be avoided by reducing the variability to a minimum. One firm used quality control to determine this variability as a basis for technical improvements, so that to-day it is only necessary to give on the average, one per cent. overweight to meet the legal requirements.

Recently, a manufacturer of chocolate has adopted the same technique for controlling the weight of his 2 oz. blocks. He has now been able to reduce his average overweight to about one third of its previous value and hence avoid a price increase, despite advances in the cost of raw cocoa.

BATTERIES

Average amount of essential materials used has been safely reduced without shortening the life of the batteries, by quality control methods.

A similar problem exists in the manufacture of such articles as

batteries for radio and cars. Here the life of the battery is determined by that of the first cell to fail and ideally all cells should fail simultaneously. Generally, failure occurs because of a deficit of the active material, zinc or lead, so it is necessary to obtain the greatest uniformity among the cells. Quality control methods have been used here to measure the variability, and hence, by technical improvements, reduce the average amount of those essential materials without detriment to the life of the battery.

AIRCRAFT COMPONENTS

Quality control enables the manufacturer to determine the degree of variation in aluminium extrusions. Excess weight has been halved with out reducing the strength of the extruded sections.

One other aspect of the same statistical problem occurs in the aircraft industry. Here it is essential that all members of a structure should have a certain minimum strength. This means that the extruded sections of aluminium alloy must not be smaller than a certain minimum size. However, it is also desirable that the section should not greatly exceed this minimum, as the additional weight corresponds to a reduced pay load. It has been found that much of the variation in the size of the material occurs from batch to batch, probably due to wearing of the dies. Quality control has now enabled the manufacturer to determine the inherent variability of the extruding process and ultimately it has been possible to halve the excess weight.

It is reported from Switzerland that statistical quality control is now being used within the range of hundredths of a millimetre in precision engineering. Quality standards are first established by study of large samples to deter-

mine whether the manufacture is stable and if so what is the inherent process variability. This knowledge is then used to determine the appropriate control limits, which are applied to samples taken during manufacture. The components are divided into three classes according to the precision of the process relative to the specification, with a different degree of control according to the class of work. All batches of components are further inspected when completed and, in doubtful cases, they are inspected piece by piece with semi-automatic or automatic gauging equipment. Periodic checks are carried out on the work passed by the automatic apparatus to ensure that the machine is functioning satisfactorily.

WATCHMAKING

Results obtained after adopting quality control showed a 50 per cent. decrease in defectives with a 10 per cent. increase in the rate of production. In addition the number of inspectors was reduced from 15 to 5.

Another interesting Swiss application relates to the use of quality control in watch-making. This includes the manufacture of both high precision screw threads and jewels. As in the previous example, patrol inspection is supplemented by final batch inspection to give a guarantee of the out-going quality level. Sequential methods of sampling are generally used rather than the simpler single sample. The measurements are taken by patrol inspectors and evaluated by a statistical staff under the control of the chief inspector. The results obtained by one firm show a 50 per cent. decrease in defectives with a 10 per cent. increase in the rate of production, although the number of inspectors has been reduced from fifteen to five.

Standard quality control techniques are now being applied in Belgium for the control of the

strength of cotton threads. More advanced techniques, such as analysis of variance and regression analysis, are also used in this industry to investigate the properties of raw cotton, and similar work is being done on woollen fibres and artificial textiles. The new industry of nylon spinning in Great Britain used all these statistical tools from the beginning. In addition, the Belgians are using quality control in such diverse industries as paper manufacture, where rejects have been halved, steel, incandescent lamps and mining, where the complicated statistical technique of multiple curvilinear regression analysis has been used to evaluate coal seams.

In the U.S.A., quality control, in its extended sense, is now being used in nearly all the major industries. These range from aircraft manufacture down to the brush industry and from chemicals to printing; it has even been used to determine the quality of meat served on aeroplanes.

In a new installation in the motor car industry, one of the largest manufacturers is now operating the technique throughout his plant. This is being supported by a widespread publicity campaign to make all of his employees "quality conscious," together with a systematic educational programme to teach the principles of quality control to all his supervisory staff. This firm is also encouraging its sub-contractors and suppliers of raw materials to operate quality control in their own works.

MAIL ORDER

Quality control has been applied by an American mail order firm with the result that clerical errors have been considerably reduced and customer relations improved.

An original use of quality control in the U.S.A. occurs in a firm supplying the public with a wide range of consumer goods by mail order. Each stage of the execution

of the orders received is subjected to sample checking and the results are plotted on control charts. Clerical errors have been considerably reduced by acting on these charts with a corresponding improvement in customer satisfaction.

Some Dutch firms are using quality standards to assign workers to the jobs best suited to their skill, experience and ability. Separate quality control charts are used for each operative performing the same job and the average of those, consistent with one another, is considered to be the quality standard for that operation. Any operative consistently producing work of lower quality is given an easier job requiring less skill. As this is paid at a lower rate, each worker tries to maintain the quality standard. Conversely, if a worker achieves results better than the average, he is rewarded by a quality bonus or given the opportunity of doing more skilled work with higher rates of pay.

Very few of the firms who adopted quality control during the war as a tool of scientific management, rather than as an inspection technique, have abandoned its use. Frequently, they found that the inspection costs were increased, but that the overall cost of the product could be reduced by making use of the information derived from the control charts. However, it is first necessary to convey this information to top management.

One of the lesser known assets of the control chart is its use in the interpretation of data for the benefit of management. The ordinary progress chart with the successive points joined by straight lines may be misleading since it emphasizes the rate of change among the last two or three readings, rather than conveying an impression of the overall picture. On the other hand, the same information, presented as a control chart with separate points and the appropriate control limits, indicates

Continued on page 111

BUSINESS



In nine short years, Harold Chapman built up from scratch a research team that produced the Sapphire jet engine—and put the British aeronautical industry well ahead of all competitors. Today, the Sapphire is being produced in the United States—from British blueprints. One reason for its success is the Company's flexible management policy which allows development to flourish, encourages technicians and trains new technical staff.



He Sells British "Know How" to the U.S.A.

FOR a firm to export goods to the United States today is meritorious. For them to export technical "know-how" to the same destination is startling. For them to do so when, only eight short years ago, they had practically no research department at all is almost miraculous. Yet this is precisely what, under the able leadership of their managing director, Harold Thomas Chapman, C.B.E., F.R.A.E.S., M.I.Mech.E., Armstrong Siddeley Motors, Ltd., of Coventry are doing.

Tom Chapman has recently returned to this country with a seven-year agreement with the Curtiss-Wright Corporation under which they will manufacture the Sapphire jet engine from Armstrong Siddeley's blueprints. Little wonder that he was awarded the C.B.E. in the last Birthday Honours list and that the Hawker Siddeley group, of which Armstrong-Siddeley is a member, have appointed him to the board of the Group.

Now 54 years old, Tom Chapman began as an apprentice in a

steelworks and served with the R.F.C. and R.A.F. in the First World War. He later spent three years in the drawing office of C. A. Parsons & Co., Ltd., the Newcastle-on-Tyne steam turbine manufacturers, and after two years as assistant engineer with a colliery company joined the design office of Sir W. G. Armstrong Whitworth Ltd., at Elswick, near Newcastle.

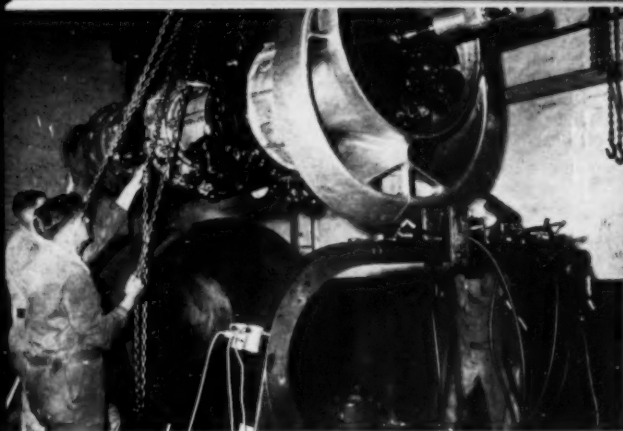
In 1926 Lord Kenilworth, then Mr. J. D. Siddeley, who was on the Board of Armstrong Whitworth, asked Chapman to join his company at Coventry. His life work then began. Between 1926 and May 1934 he designed the *Leopard*, the *Double Mongoose*, the *Cheetah* and other aircraft engines. After a period as aero-engine production manager he became works manager, and between 1937 and 1944 was responsible for the production of over 40,000 aero-engines as well as *Armstrong Siddeley* motor cars and torpedo engines, tank gear boxes and gyroscopes. He then became successively deputy general manager,

general manager, director and managing director, finally being appointed to the board of the Hawker Siddeley Group, the world's largest aviation organization. During the last war the Group produced over 40,000 aircraft and over 40,000 aero-engines, its total payroll at the height of

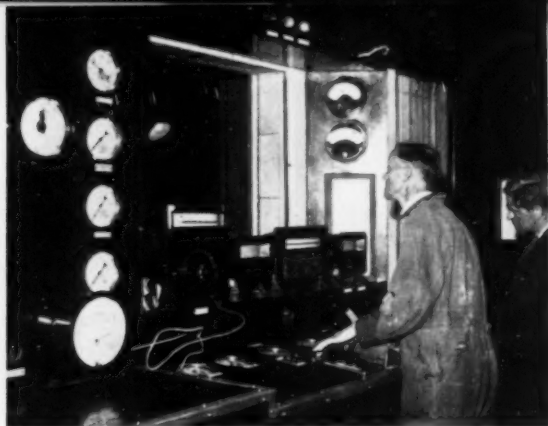
By A. K. ASTBURY

production being more than 100,000 men and women. Among its constituent companies are Gloster Aircraft, Sir W. G. Armstrong Whitworth Aircraft, Hawker Aircraft, A. V. Roe & Company, High Duty Alloys and others.

Chapman's visit to the United States was to see that British technical knowledge and experience, particularly in the design, manufacture and operation of jet engines, should be freely available to the Americans, and that the exchange agreement between Armstrong Siddeley and Curtiss-Wright, which covers technical



Left, lowering an Armstrong Siddeley jet on to the testing bed.



Right, where theories get put into practice. Instruments tell the technician facts he needs to know.

and production information, should be off to a good start.

Research and development, it is obvious, now bulk large in the work of Armstrong Siddeley. Of those working on gas turbine engines alone there are now some hundreds of technicians, either university graduates or men qualified through experience, and these are divided equally between draughtsmen, designers, statisticians, and so on. In all a staff of some thousands is working on gas turbine developments, including a large force of skilled workmen.

Explaining how research and development had come to have an increasingly important place in the work of Armstrong Siddeley, Mr. Chapman says that until 1939 the company had little or no research

department. "But as soon as we started on jet engines," he adds, "it was realized that a research department was not just a necessary evil—it was a vital part of the equipment of any firm proposing to make such things. And, with the constant support, both of Sir Frank Spriggs, managing director of the Hawker Siddeley Group, and of the Ministry of Supply, we have since been able to develop our research department to a considerable degree.

"In the first place we recruit most of our technical men from the universities, and in a sense train them ourselves. We have to 'carry' them for about two years, but then we begin to get results. We very rarely take men who have had a good deal of experience in other similar concerns;

we depend largely on those who come here first with no real knowledge save academic knowledge, but who have since built up their position through, and inside Armstrong Siddeley. I myself came here in 1926 at a salary of under £400 a year and am therefore an illustration of this same principle.

"We usually fill executive positions without going outside the company. Senior posts we fill with juniors from within the organization rather than by 'experts' from outside it. And while many of our technicians are university graduates we don't look down on the night school man. There is not a single established technician in this firm who does not hold at least a Higher National Certificate.

"We don't organize research 'teams' as such; we just get a band of people together with one aim in view—generally, of course, to design a gas turbine engine. They all know each other and they all know what they are aiming for; and the result is partly a research and partly a development team."

On Mr. Chapman rests much of the responsibility for changing Armstrong Siddeley from a purely producing organization (which during the war turned out *Cheetah* engines for training aircraft, and little else of an aeronautical nature) into a concern which has



Design in the making. Part of the large drawing offices at Armstrong Siddeley's Works.

BUSINESS

carried developments to a stage where these can be sold on the international market. "It was always my aim," he says, "to build up the research and development side of Armstrong Siddeley; and I think we have made a good deal of progress during the last eight years or so. When, during the war, Lord Beaverbrook was Minister of Aircraft Production, our position was such that he decided we should do nothing but manufacture these training aircraft engines. But as a result of developing our research side since, we have reached a position in which we can enter into an agreement with one of the foremost United States aircraft companies.

"My training has been that of the designer and of the draughtsman and I have always believed too in the saying, 'As ye sow so shall ye reap,'" Chapman added. "And so whatever suggestions my technical staff have made to me within reason I have agreed to and supported."

But if there is one thing which Chapman avoids like the plague in the conduct of his business it is the existence of water-tight compartments. His man in charge of aerodynamics must know something about what is going on in other departments. Research workers must not be segregated from development workers. In fact, so flexible is the organization that it might be possible to discover that precisely the same people were doing research and development work on different days. "Flexibility is indeed the keynote of our work here," says Chapman. "Everyone has some knowledge of what the other man is doing. It is partly a legacy of our small beginnings, partly a considered policy."

On the question of exporting British "know-how" Tom Chapman has clear-cut views. It could not be otherwise since Armstrong Siddeley's seven-year agreement with the United States firm of Curtiss-Wright covers a full interchange of technical and manufacturing information. "They paid us a great deal of money for what

technical information we could offer them; and I know that they will play their part in offering us manufacturing information. The interchange works well. We have men out there and they have men here, usually up to ten on each side of the Atlantic.

"I am convinced that we have to be completely free and absolutely honest in this business of exporting 'know-how.' The freer we are with our technical information the more manufacturing information we shall get back. And that in itself has already paid dividends. In any case, if you hang on to technical knowledge with both hands it disappears; exchange what you know to-day, and tomorrow it will be twice as much.

"On our side we have the knowledge of how to make a small number of very advanced and successful aero-engines; the Americans have the knowledge which will allow them, once presented with one of our aero-engines, to

duplicate it ten-thousand times at the minimum possible expense. We are good on the technical side, not quite so good on the manufacturing side; I would, for instance, rather be faced with the problem of producing a much better engine technically than the *Sapphire* than producing for example 100,000 *Sapphires*. The Americans I imagine, would probably take the opposite view."

Chapman mentions another interesting difference between manufacturing conditions here and in America. "Over here," he says, "whenever you come up against a severe technical problem, that is the time you get most support from the government authorities. Then, when everything is plain sailing, you may be surprised that they almost tear the daylights out of you! I fancy that the reverse is the case in the United States."

Chapman has no cut-and-dried programme for the conduct of in-

9 POLICY POINTS OF A DISTINGUISHED TECHNICIAN

BUILDING THE TEAM

1. Research is a vital part of any firm making highly specialized products.
2. Research needs technicians. These should come from universities rather than industrial concerns.
3. Fill executive positions from inside the organization. Don't look down on the night school man.
4. A lot of talent is going to waste. Armstrong Siddeley's apprenticeship scheme bridges the gap between school and manhood.

GETTING DOWN TO WORK

1. Bring together groups of people who know each other and have one aim in view. The result is a joint research and development team.
 2. Don't allow a technician to forget the time factor. The perfect solution in 18 months is no use when you want an overall solution now.
 3. Be flexible in organization. Give every man some idea what the others are doing.
 4. Hold internal meetings often—but only when necessary. Let people say what they think.
 5. Be free and honest in the business of exporting "know how." Exchange what you know today, and tomorrow it will be worth twice as much.
-

ternal meetings and conferences. Regular technical, and technical and manufacturing, meetings are held. They are open meetings; anyone can say—and does say—what he thinks. But if there is nothing to discuss the meetings are not held.

There is another subject about which the managing director of Armstrong Siddeley feels strongly, and that is the question of time. "We don't allow a technician to become so interested in his problem that the time factor is of no importance. The perfect solution to a problem in 18 months is no use to us when we want an overall solution now. We must, at least, be in a position to provide the best possible solution on any particular project when it is requested."

One of Chapman's important subsidiary interests is Armstrong Siddeley's apprenticeship scheme. During the last six years the number of apprenticeships has risen from 100 a year to 400. The company has its own training school for the boys and there are opportunities for picked apprentices to

go on to the university.

A boy's happiness, no less than a man's, depends overwhelmingly on doing the job for which he is temperamentally suited, Tom Chapman believes. Every boy has an aptitude in one direction or another, but it needs to be brought to the surface and directed into the right channels. This can best be done in the impressionable and enthusiastic years immediately after leaving school.

"Our apprenticeship scheme is designed to bridge the gap between school and manhood and to provide first-class training in all branches of automobile and aeronautical practice. Tuition and instruction are individual, and comprehensive progress reports, continually under scrutiny, ensure that the particular qualities of each apprentice are developed to the full."

It would be an exaggeration to say that Mr. Chapman knows by name everyone of the company's 7,000 or so employees. But he is quite sure that they nearly all know him—which is almost as important. "That is one of the ad-

vantages of something like a quarter of a century's association with the company," he comments; "one builds up something much more than an official background."

And the company's long-service statistics prove its value. On a recent occasion the presentation of a clock was made to each employee of the Hawker Siddeley Group with 25 years' service or more to their credit. Some 850 throughout the Group were entitled to the gift; of these no less than 620 came from Armstrong Siddeley, although less than a sixth of the Group's employees were then on Armstrong's payroll. And even of these 620 long service employees most had in fact been working for Armstrong Siddeley for more like 30 years.

Mr. Chapman is a man refreshingly free from those idiosyncrasies of manner to which the great industrialist is sometimes prone. He has, indeed, more of the personal dignity and austerity—even, perhaps, the scepticism—of the professional soldier than of the uncritical enthusiasms one sometimes encounters among a minority of industrialists. He admits, too, to a hobby which consorts ill with artificiality of any kind—fly fishing. The three bottles of colourless liquid which peep from the partly opened drawer of his desk have no part in aircraft construction; they came from a shop in New York's Fifth Avenue, and were flown over to perform some mysterious function in connection with the waterproofing of angler's flies. If he is not to be seen in the factory at some time on Saturday or Sunday it is probably during the fly-fishing season when he is enjoying one of his rare periods of relaxation at his favourite spot on the river Arow in Radnorshire. "Fly-fishing and designing and making gas turbines have at least this one thing in common," he maintains, "that both demand absolute and complete concentration on the matter in hand to the exclusion of all else."

Manufacturing to fine limits.
The internal rotor of a jet engine.

BUSINESS

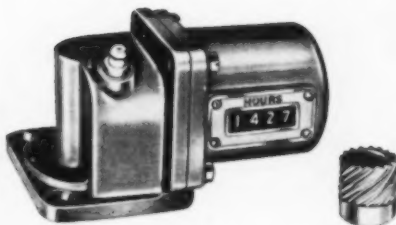


Look Out for WHAT'S NEW



LIMPET LIFTER

CHRISTENED the *Limpet*, this new lifting device differs from its shell-fish namesake in one respect—its grip can be released instantly with a trigger. Designed for handling glass, sheet-metal, tiles and other materials with sharp edges, *Limpets* eliminate cuts and bruises and do away with the need for costly gloves. Models with one or two 4-inch rubber suction cups are available.



ENGINE LOG

MAINTENANCE jobs on internal combustion engines are usually carried out after a specified number of running hours. Fuel and running cost checks also demand an accurate check of the time an engine has run. This recorder will do the task for as long as 10,000 hours. Various gearboxes can be supplied enabling the recorder to be run from the fuel-pump, camshaft, etc., of any type of engine.



BRILLIANT SALESMAN

SO bright is the light from the *Rotavisor* robot salesman that it can be used successfully in a shop window in full daylight. The mechanism will automatically show a sequence of up to 80 pictures carrying a powerful, arresting sales message. The life of the mercury-vapour lamp is 500 hours. A console model 38ins. high, stands on the floor of a showroom; table top models are also available.



PAINT GAUGE

FINDING the thickness of a coat of paint or other non-ferrous material on a ferrous base is the function of this pencil gauge. The principle is the same as in the domestic spring balance; the hook is however replaced by a magnet. The magnet is attracted to the ferrous base with a force proportional to the thickness of the paint or other substance. A chart is used to convert the scale readings.

Barriers to international trade have forced many firms to set up factories in overseas territories to manufacture the goods they formerly imported. Such a step, while essential to maintain sales and goodwill, brings special problems of control. This is the story of how Cadbury's ensure that the goods sent out under its labels from its overseas companies shall match up to the high standards of the British factories.



The factory of Cadbury-Fry-Pascall Pty., Ltd., near Hobart, Tasmania.

How Cadbury's Control Their Overseas Subsidiaries

By A. G. THOMSON

IN the last forty years, the overall volume of international trade has steadily declined. In particular, Britain's position as an exporter of manufactured products to a world that supplied her with raw materials and food in exchange has been, and still is, changing rapidly. Countries that have been traditional sources of primary materials have set up their own manufacturing industries, and protected them against the blast of competition by prohibitive import restrictions and tariffs.

To overcome these barriers to their normal export trade, more and more British firms are finding it necessary to set up subsidiary manufacturing companies in overseas territories, or at least to arrange for the manufacture of their products under licence by local firms.

Such a process, however necessary, immediately postulates seri-

ous managerial problems. Financial control over overseas subsidiaries is comparatively easy to maintain, but how can the British manufacturer be sure that the products carrying his name and trademark conform as closely as possible to the standards maintained at home?

One firm that has tackled this problem successfully is Cadbury Bros., Ltd., and their associate company J. S. Fry & Sons, Ltd. Cadbury's were early in the field; their first overseas subsidiary, Cadbury-Fry-Pascall Proprietary, Ltd., was founded in Australia in 1922 to operate a factory in Tasmania. Eight years later, a New Zealand company, Cadbury Fry Hudson, Ltd., was formed with a factory at Dunedin, followed rapidly by a Canadian company, Fry-Cadbury, Ltd., of Montreal (1930), an Irish company, Fry-Cadbury (Ireland), Ltd., of Dublin (1932) and a South African company, Cadbury-Fry (Africa),

Ltd., of Port Elizabeth (1937).

Each of these overseas undertakings is a locally registered company with a resident board of directors. The whole or at least the majority of the shares are held by British Cocoa and Chocolate Co., Ltd., of Bourneville, who also act as a holding company for Cadbury Bros., Ltd. and J. S. Fry & Sons, Ltd. Capital of the holding company is £6,250,000.

When the policy of forming autonomous subsidiaries was first adopted, two problems arose. The first was the establishment from scratch (except in New Zealand, where partnership was entered into with an existing firm), of an organization that could duplicate the technical resources and know-how of the parent company, with its knowledge and experience of 127 years of manufacture and marketing. The second was the elaboration of machinery to ensure that the policies and progress

of the new companies went hand-in-hand with those of the parent.

Inevitably, the first step was the dispatch of a team from Bournville and Bristol to undertake or supervise the erection of the factory and the installation of machinery, and to form at least the nucleus of a directorate and staff, down to foremen and forewomen level. This team then undertook the preliminary training of local workers for work on the shop floor.

Promotion Methods

As time went by, these local workers gained sufficient experience to warrant their promotion to higher levels, and the problem arose as to whether it was preferable to continue sending out technicians from Britain, or to bring promising local recruits back to Britain for further training in management methods.

The promotion of local talent has been adopted as a general principle, and during the early years there was a steady stream of budding managers from overseas returning to Britain for training. The trainees were brought over quite early in their period of service with the company, and usually at shop floor level. They spend a period of perhaps a year at the Cadbury factories at Bournville or the Fry factory at Bristol before returning to take up an executive or supervisory position at home. Occasionally, posts become vacant overseas for which no suitable candidate is available on the spot, thus providing opportunities for sending out a few additional home-trained men and ensuring that the traffic is not all in one direction.

As the subsidiaries have advanced, they have naturally developed their own training facilities, and the numbers coming home have dwindled. Practically all employees are now local-born men and women, except for one or two directors and technicians, and today no overseas factory will have more than one or two trainees at Bournville or Bristol at any one time.

Emphasis has now passed from training to liaison, as paternal rule has given way to the more equal co-operation between adults in the same family. A regular rota of visits is made in both directions at all levels of management. There is a constant interchange of visits between directors, while technicians from overseas frequently visit the parent factories in order to solve specific problems. Overseas directors and technicians also take the opportunity offered by a visit to Bournville or Bristol.

In addition to personal contacts, a constant exchange of information takes place, whereby the overseas factories are given full details of any improvements in manufacturing methods or products developed by the parent company. This is organized by the Overseas Factories Committee, a body which meets every fortnight at Bournville, and consists of representatives of all the departments concerned. Among its members are engineers, chemists, quality control personnel, sales and advertising personnel, cost accountants

and finance officers. The committee acts as a clearing-house for all information affecting the overseas factories, and all correspondence, reports, and samples pass through their hands. There is thus a constant liaison between all the members of the Cadbury commonwealth, without effort being wasted in duplication.

Supplies of cocoa beans for the overseas factories are purchased by the parent company, and shipped direct to them from the Gold Coast and Nigeria. Under this arrangement, the subsidiaries benefit from the expert knowledge of quality possessed by the firm's buyers in West Africa, many of whom are Africans, and also from the head office's long experience of buying in this highly specialized market. Routine business connected with the purchase of cocoa and other raw materials is handled by a special Overseas Factories Office.

To ensure that the overseas products conform fully to home standards, samples are exchanged regularly between Britain and

Continued on page 110



These new Cadbury and Fry packs, like their predecessors, will be standardized throughout the world.

MEN OF VISION

PRACTICAL APPROACH TO MARKET RESEARCH

GRAEME CRANCH, 41-year old head of the Research Department of Mather and Crowther, and this year's president of the Market Research Society is a man who has devoted a lifetime to helping businessmen to find out what their customers want. Born in 1910 at Ewell, he went straight from schooling in the classics to Rowntree & Co., Ltd. as a trainee, emerging, on completion of his training, into the marketing division, where he made his first contact with consumer research problems. After seven years with Rowntree's he returned south to join the London Press Exchange, Ltd., until the outbreak of war interrupted his business career. For six and a half years, he served as a Territorial with the Gunners.

On returning to civilian life, he became head of research at Mather and Crowther, Ltd. In addition to his work for his firm he has taken a very active part in the development of market research throughout industry. He joined the Market Research Society in the first year of its existence, became secretary-treasurer for two years, then vice-president, and, this year, president. He is one of the founders and is vice-president of the European Society for Opinion and Market Research. His year of office in the Market Research Society has been an extremely active one, which opened with the holding of the first weekend schools in the provinces for students and newcomers to market research. Then there was the very successful session on market research in the recent International Advertising Conference, and



Graeme Cranch, head of the Research Department, Mather & Crowther, Ltd.

finally the organization of the first International Conference on Opinion and Market Research to be held in this country. Over 90 delegates from 12 countries will meet in Tunbridge Wells from September 10 to 14.

Cranch's attitude to market research has been determined by the fact that he came into it from marketing. For him, research is a practical method of selling goods, and an integral part of a businessman's technique. He detests semi-scientific jargon; market research, for him, is applied common sense.

This practical approach is carried out in his own business. Every member of his staff must periodically do some field work, going out into the highways and byways to make personal contact with consumers of all sorts of products. This goes for Cranch himself, who believes in seeing local conditions to help him interpret results more accurately.

Too much emphasis, says Cranch, has been put on the large-scale survey, that produces results to two places of decimals. Businessmen, to quote him: "Just are not interested in those damned

dots." What they want is speedy information, that can be got at reasonable cost and with accuracy. Small samples, of the order of 200 to 300, can often give adequate results, for practical purposes, at a fraction of the cost. He would rather do half a dozen smaller surveys for a client than one detailed investigation of a single aspect. By this method, a new product or method can be tested before it happens; the "hunch" can be avoided, and costly and unjustified capital expenditure eliminated. Even without a formal survey, a good deal more market research could be done by firms by analysing sales and other records already in their possession.

More, too, he feels, could be done by retailers in co-operation with market research workers to determine the best selling methods for a particular product. It is rather a sore point that this co-operation should sometimes be difficult to obtain.

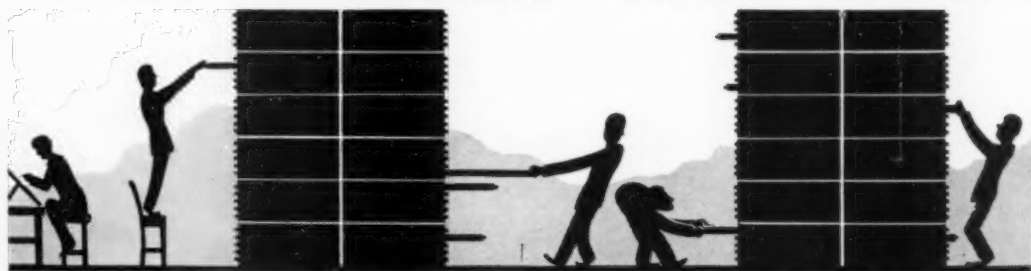
THEY STARTED A NEW INDUSTRY

IN 1933 two refugees from Europe—Ernest and Henry Wallace—came to London and set up business in St. John Street in the City. They dealt, or proposed to deal, in three types of merchandise—ladies' neckwear and scarves; ladies' belts; and ladies' buttons. They soon found out that their first two lines were unsaleable, and of their buttons it was said, "These are a typical Continental product and cannot be made here." So the two brothers set themselves at once to manufacture that "typical Continental product" in this country. They

Continued overleaf

BUSINESS

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Men of Vision

were joined at this stage by a third partner—Mr. F. P. Kendall, who looked after the financial side of the business.

At that time there was a great home demand for buttons which was only partially satisfied by home production. In 1938, for instance, Britain manufactured 7½ million gross of buttons and imported eleven million gross, whereas in 1950 hardly any buttons were imported and 25 million gross were manufactured, approximately 25 per cent. of them being exported.

Ernest and Henry Wallace set themselves to satisfy this pre-war demand for high-class buttons. They made plastic buttons, dress jewellery and similar fancy goods to such purpose that within four years they were asked by the government whether they would open a new branch of their business in, or bodily transfer it to, one of the Depressed Areas. The two brothers agreed, and after visiting all the areas where new industries were needed, decided to move to St. Helen's Auckland, some two miles from Bishop Auckland, coal and iron town in the county of Durham. There, in a modern factory on the trading estate, the firm of Ernest and Henry Ltd (its title formed by the brothers' christian names) now employs a staff of approaching 300 and produces well over 10,000 gross of buttons every week.

Nor is the company concerned only with buttons. It also makes the machines which make the buttons. One type of machine, of which the company has already sold 350, could otherwise have been bought in this country only with dollars; while another machine is, it is claimed, well over 100 per cent. faster than the comparable type made in Germany. The two brothers, who took refuge in this country nearly twenty years ago, have not only brought a new and flourishing industry to what was one of the poorest areas of Britain, but they are now producing machines which pre-war were



Ernest and Henry Wallace, directors, Ernest & Henry, Ltd.

virtually the monopoly of Germany and Italy.

In spite of huge increases in the cost of labour and raw materials, Ernest and Henry Wallace have managed to keep the prices of their buttons down by more economical methods of production. Their buttons, indeed, cost little more than they did before the war, simply because the type of machine which then turned out eight or nine gross of buttons per hour now produces up to 30 gross.

The company went to St. Helen's Auckland with eight key workers from London, who moved to County Durham with their families. But in time all returned to the south, and the company had the task of recruiting and training their staff in a district which was, in their own words, "un-factory-minded." But local labour proved remarkably adaptable and within a year the workers at Ernest and Henry's were as skilful as any in the industry.

The two directors set great store by the bonus scheme they have introduced in the factory. There is, first of all, an attendance and punctuality bonus scheme which helps to ensure good time-keeping and has meant in practice that rarely more than half-a-dozen workers are away at any one time; there is also a production bonus scheme, and the initial wages of many of the workers are more

than doubled by the addition of this bonus.

"If they are willing to work we are willing to pay," is the attitude of the company as expressed by Mr. Henry Wallace. Production bonus is paid on the output of each individual worker—there is no pooling of bonus.

During the war the factory was turned over to the manufacture of tank and aircraft components and at present a subsidiary, the Bond Moulding and Engraving Company, continues to do engraving on metals and plastics producing lift indicators, ships' plaques, instrument calibrations, and the like.

The two brothers now have representatives in all parts of the world where buttons are exportable. Many countries do not permit their importation, but even so, in buttons and button machinery the company does export business each year to the value of some £40,000. Both members of the firm also travel widely themselves; and it is one of the pleasantest things about their success that these men should make their home quite happily in the district.

"There are advantages in London and advantages in the provinces," says Mr. Henry Wallace, "but I would not care to return to London. I am quite happy here making my home in a smaller community."

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EMI 14

How a Million Parcels a Year are Safely Delivered

By ROBERT SPARK

BUSINESSMEN do not usually pay much attention to non-profit making concerns when it comes to seeking efficiency in the office. But there are organizations which yield as rich a harvest of ideas as any conventional business enterprise. Such an organization is C.A.R.E., Inc., which employs modern methods in the sale and distribution of gift parcels.

C.A.R.E.—or to give it its full title, Co-operative for American Remittances to Europe Incorporated—was formed by 26 large

American welfare agencies in 1945. Its object was to provide a safe channel through which Americans could send individual person-to-person aid abroad. The aid takes the form of parcels. Most of them are food parcels, but other specialized packs contain such things as household linen, knitting wool and blankets.

From relatively small beginnings (deliveries were first commenced with surplus U.S. army rations in France in May, 1946) C.A.R.E. has extended its activities to cover most of Europe and it is run on big business lines. Of particular interest is the paper work involved in getting these gift parcels delivered to the right person in the shortest time. This is not as easy as it sounds.

Centre of C.A.R.E.'s operations is its offices in New York, which are supplemented by field offices in all principal U.S. cities. To feed the parcels to recipients in the various countries, overseas missions have been established. In the British Isles, the main one is in London with small branch offices in Scotland and Northern Ireland. The system employed begins in any one of the American field offices. Mr. Jones of the U.S.A. goes to one of these offices and says he wishes to send a food parcel to Mr. Smith in Britain. He selects the type of parcel he wishes



Unique and widespread are the operations of C.A.R.E., Inc., a non-profit making organization which is run on strictly business lines. C.A.R.E. uses the latest methods to "sell" gift parcels to American donors, and equally up-to-date systems to distribute them to the European recipients.

to send, pays for it and leaves his own name and address and also his British friend's name and address. He is then given a temporary receipt.

This order is airmailed to C.A.R.E.'s headquarters in New York for processing. It immediately goes to the department dealing with British parcels, where Europeans qualified to spot discrepancies in names and addresses edit illegible writing and check doubtful addresses. The next stage is for the order to receive a classification number. It is then passed to the punched card department, where a master card is prepared, together with two other cards, which are termed remittance receipts. Besides having certain statistical information punched into them, these cards have typed on them the series number, number of packages, type of package, date, name and address of beneficiary and the name and address of the donor. The master card remains in America. The two remittance receipts are sent with others in batches (together with a register

C.A.R.E. Inc.
18 LOWNDSE SQUARE, KNIGHTSBRIDGE, LONDON, S.W.1
Telephone: BLOOM 5434

Dear Sir or Madam:

GIFT PARCELS

You are to receive within the next sixteen days a Gift Parcel from your friends in America whose name and address appear on the enclosed delivery receipt.

To enable us to ensure safe delivery and to advise the donor in America that you personally have received the gift, we request that you follow these instructions:

1. IMMEDIATELY advise us if you wish the Gift Parcel sent to an address other than shown on the enclosed Delivery Receipt card. Use the "Change of Address Notice" at the bottom of this letter, and quote all numbers exactly as shown on the Delivery Receipt card.
2. SIGN the Delivery Receipt card ONLY after receiving the Gift Parcel.
3. Do not fold or tear the signed Delivery Receipt card.
4. Use the prepaid envelope herewith enclosed to return the signed Delivery Receipt card.
5. RETURN the signed Delivery Receipt card IMMEDIATELY after use. It will reach us WITHIN THREE DAYS after the Gift Parcel has been delivered to you.
6. The C.A.R.E. Mission in London will then use the signed Delivery Receipt card to clear its records, and thereafter will notify your donor of the successful delivery.

Allow the full sixteen days to elapse before making any query, should the Gift Parcel not reach you. In making any query, you must quote ALL THE GROUPS OF NUMBERS shown on the Delivery Receipt card.

Yours faithfully, C.A.R.E. Inc.

CHANGE OF ADDRESS NOTICE

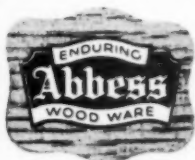
PLEASE FILL IN THIS PORTION WHEN COMPLETED AND RETURN WITH NEW ADDRESS ON THE PANEL FOR QUOTING REFERENCES FOR ANY OTHER PURPOSES.

Grouped: QUOTE ALL NUMBERS

NEW ADDRESS:

The printed letter which is sent to the person about to receive a gift parcel.

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Sorting orders at the New York Headquarters of C.A.R.E., Inc.

which contains the names of recipients, the number of parcels and their type) to the overseas mission in London.

All this material goes by air freight to save time, as C.A.R.E. guarantees to deliver within 90 days of receipt of order or to refund the money. In actual fact, the average time taken from an order being received in the New York office to the receipt of the card guaranteeing delivery is only 20-30 days.

At the overseas mission in Lowndes Square, London, the register is checked against the cards and a label with one carbon copy is then typed for each parcel. One of the punched cards is despatched to the beneficiary complete with a stamped and addressed envelope and a printed letter. The letter tells the recipient that he is to receive a gift parcel within the next 16 days. If he is changing his address there is a detachable portion at the bottom of the letter which he completes and returns. He retains the punched card (which now acts as a delivery receipt card) until he has received the parcel.

The other punched card, plus the label and label copy, go to the

firm who are under contract to C.A.R.E. for the handling, transport and delivery of parcels. In the case of Britain this is carried out by Carter Paterson and they are responsible for the packages from ship to delivery. They stamp the label copy and the punched card and return them—the label, of course, goes on the package itself.

The remittance card or delivery receipt is returned by the beneficiary to the London office when he has received the parcel and is kept and filed. The other punched card,

which has been stamped and returned by Carter Paterson, is sent to New York, where it is photostated. The actual card is then mailed to the American donor as proof that the parcel has been delivered.

The filed copy of the label which, as already mentioned, was returned by Carter Paterson, is filed in C.A.R.E.'s London office and acts as a check against the non-return of the beneficiary's receipt. A careful check is kept on all stages so that the four main points in C.A.R.E.'s operations are covered satisfactorily. These are:

1. That the package is delivered safely.
2. That it is received by the person for whom it was intended.
3. That the donor is informed of its safe delivery.
4. That it is done well within the 90-day time limit, self-imposed by C.A.R.E.

To cope with such unusual requirements and to deal with many fluctuations in orders require the utmost efficiency on the part of C.A.R.E. Some idea of the scope of the organization can be gauged from the fact that between May, 1947 (when deliveries in Britain first commenced), to February, 1951, over 750,000 parcels were distributed in the British Isles.

Continued overleaf

The card punching department at New York. Here the master card and remittance receipts are prepared.



**'Those
people
can
never
find
anyone'**



You've used this phrase pretty often when you've had to hold on while a search is made for the man you want. You've been annoyed — and taken a poor view of the firm you're calling. But are you sure your clients are not kept waiting while a search is made for you? Do messengers have to run from office to office interrupting everyone's work when you are wanted? Or does your switchboard operator have to neglect incoming calls while she rings half-a-dozen extensions trying to find you?

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MASTER CLOCK CONTROLLED TIME SYSTEMS

T4A

SEPTEMBER, 1951

65

The total number of parcels handled by the organization as a whole, runs at over 10 million and their value is over 100 million dollars.

By keeping the expensive mechanized office equipment localised to its New York headquarters, C.A.R.E. has avoided having to purchase and set up machines in its various overseas missions. This also enables it to use local labour which may not, in some countries, be at all conversant with modern office appliances.

Ways of improving methods and training staff are constantly being sought, and in London economies have been made without loss of efficiency.

The actual parcels themselves are "assembled" in a large warehouse in Philadelphia and they are sent in ship loads to the respective countries. In Britain the transport contractors take over when the cargo is unloaded and, as already explained are responsible for warehousing and delivery.

To maintain its sales of parcels,



Europeans qualified to recognise discrepancies in names and addresses check all incoming orders at New York.

C.A.R.E. widely advertises its services in the U.S.A. The American Advertising Council sponsors this advertising, which is worth about four million dollars a year.

Press, posters, radio, and television are all used on a large scale. C.A.R.E. also conducts a continuous and extensive direct mail campaign all over the U.S.A.

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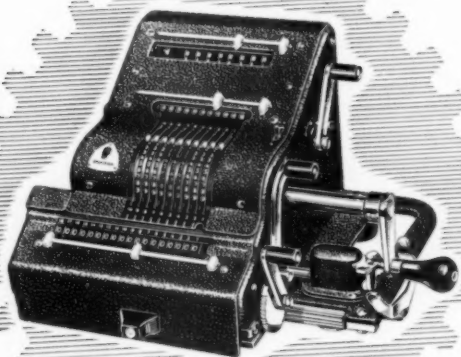
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Counting 30,000 Used Bank Notes an Hour

By MICHAEL LORANT

Counting torn or creased documents has always been a time and labour consuming job. Now an electronic machine has been devised that will do the work rapidly and automatically. It is currently being used in the United States to count bank notes, but it has many other potential uses.

MACHINES for counting sheets of paper have been commercially available for a number of years, and are giving good service in many offices.

Their sphere of usefulness, however, is limited by the fact that any documents passed through them must be relatively flat and uncreased. In certain applications, such as the counting of forms returned through the post and bank-

notes, these conditions cannot be met, and counting must be done by slow and costly manual methods.

A new fully automatic electronic counting machine, based on a completely new principle, has been designed and developed by H. M. Joseph and Carroll Stansbury of the U.S. National Bureau of Standards for the U.S. Department of the Treasury. The new "counter" counts 30,000 bank

notes per hour. Twenty-five of these machines will be placed in service soon by the Treasury, replacing the present hand-count system and saving up to £100,000 a year.

Money returned to the American Treasury is in the form of packets of 100 notes cut longitudinally into half-notes. About eight tons of currency are turned in daily for redemption. The new counter counts the packets of notes and automatically rejects those with more or less than 100.

Packets of stapled half-notes are placed on an inclined trough. A metal finger pushes the bottom packet into the machine. The stapled end is grasped by metal jaws and the packet is wrapped tightly around a spindle, spreading the outer edges of the notes against a friction band. As the spindle rotates, the notes clear the friction band and are separated by a jet of air.

The counting is done by a beam of light and a phototube system. As the notes are unfurled, interrupting the beam of light, the phototube senses the interruptions of the beam. Impulses from the phototube are fed to a binary counter which tallies the individual impulses. The sum of these impulses is used to actuate a sorting vane: if the count is 100, the



Dr. E. J. Condon (left), Director of the U.S. National Bureau of Standards and **Mr. John F. Snyder**, Secretary of the U.S. Treasury, demonstrate the electronic counter.



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DESERVES
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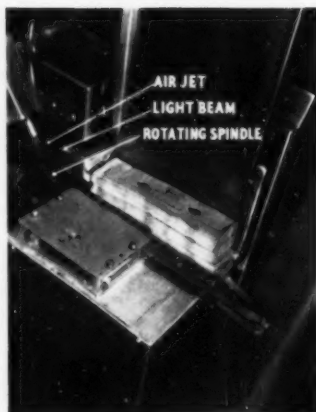
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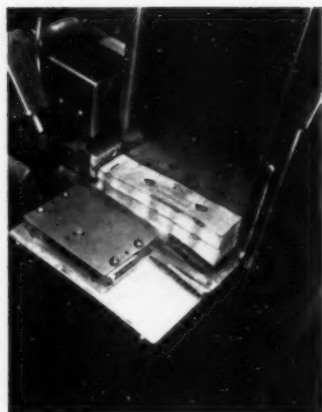
sorting mechanism automatically sends the packet into an acceptance bin; if the count is more or less than 100, the packet is automatically ejected into a reject bin. Except for filling the trough with packets to be counted and removing those already counted, the machine operates unattended. In case of mechanical or power failures, it will shut itself off.

For flexibility, each machine is a separate, completely self-contained unit, mounted on castors. For ease of maintenance, the counter is composed of replaceable, completely interchangeable sub-assemblies.

At the beginning of each counting cycle, a feeder mechanism pushes each packet endways from the inclined trough into the opening between the spindle jaws. When a packet reaches this position, an electrical limit switch is actuated, which causes the spindle jaws to clamp and rotate, rolling the packet around the spindle for counting. The jaws then release and the packet is cleared from the counting head by an additional



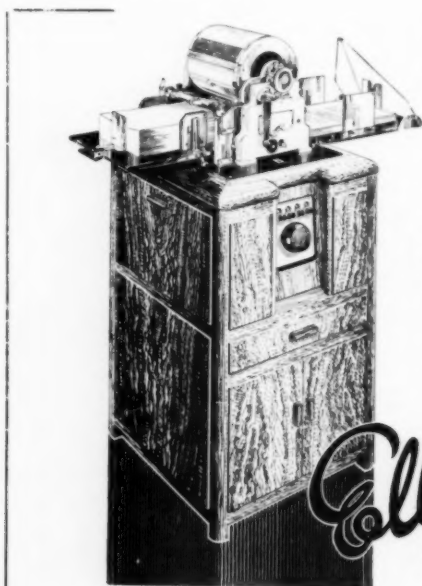
A close-up of the mechanism, showing how the bills are wound round the spindle.



revolution of the spindle. The released packet falls on a sheet-metal sorter vane which has been tilted to the accept or the reject position by an electromagnet which operates them, carried in a rotating element of a turnable assembly on top of the unit.

The electronic counter is relatively conventional. A cathode

follower applies the phototube impulses to a trigger circuit for conversion to sharp, uniform-amplitude pulses. These pulses are, in turn, applied to a binary electronic counter. The eight-stage counter is set to indicate the desired count for a correct packet of 102 (100 half-notes, plus the wrapper sheet on each side).



GOOD CRAFTSMANSHIP is its own advocate—and as proof, we still find ourselves with a waiting list of keen folk who are sure that an excellent thing is well worth waiting for. Their patience has been well tried, but we can only say that as their names are reached, they will have the best duplicators it is possible to obtain.

These machines are fully guaranteed for 10 years. The M100E shown here is power-operated, feeding faultlessly from more than a ream of duplicating paper. It has also a world-patented, fully automatic inking system which will give neat and beautifully fine copies from start to finish and its self-acting counter will immediately switch off from duplicating as soon as the pre-set number is reached. Speed and pressure are

variable, reproducing all types of work—each copy exactly alike and equally excellent—of anything that can be written, drawn or typed and we shall be glad to give further details on request.

Collams

DUPLICATOR COMPANY LIMITED

5 DEAN STREET, LONDON, W.1 • Telephone: GERrard 4558

A one handed operation



and there's an element of uncertainty about it—but there's no uncertainty about the time record made on an

INTERNATIONAL SUPERELECTRIC TIME RECORDER

*This also
is a
one handed
operation*

producing an accurate record agreeing with the time-figures shown on the front of Recorder.



Overall size, 16½" x 14½" x 9½"

For further details of this modern Attendance Time Recorder—now manufactured in England—send for free descriptive folder 509/2 and ask for details of our Profit Sharing Rental Terms.

INTERNATIONAL TIME RECORDING CO. LTD.

8, BERKELEY SQUARE, PICCADILLY, LONDON, W.1 - - - Mayfair 2004

and at Birmingham, Manchester, Leeds and Glasgow.

HEAD OFFICES — INTERNATIONAL WORKS, BEAVER LANE, HAMMERSMITH, LONDON, W.6.

AND NOW!

**THE
SIMPLEX**

FRANKOPOST OFFERS AN
OUTSTANDING NEW DESK
MODEL!



SIMPLEX — Eliminates
Postage Stamps and the
Post Book.

SIMPLEX — Prints all
values up to 6½ in
ONE impression.

SIMPLEX — gives auto-
matic accountancy by
two meter readings.

SIMPLEX — prints YOUR
Advertisement or "Return
Address."

SIMPLEX — can be justified
by a mail of 10-20 letters
per day.

*The Small Mailer's
Postal Franker*

Details from

UNIVERSAL POSTAL FRANKERS LTD

90 REGENT STREET, LONDON, W.1

REGENT 2249

SEPTEMBER, 1951

Other
"FRANKOPOST"
MODELS

MULTI-VALUE
(Hand or Electrically operated)

Prints up to 29/11jd or lesser maximum
for Inland Letters—Parcels and Airmail

PITNEY-BOWES

(Electrically operated)
High Speed Franking and
Sealing Machines

NEW for your OFFICE

Dictate on Paper

ELEGANT in appearance, the Dictorel paper-band type dictating machine incorporates unique features that make it equally suitable for use in an executive's office or in the bustling, noisy atmosphere of a general office. The machine is imported from Belgium, but arrangements are being completed for its manufacture in this country in the near future.

Dictation is picked up by a sensitive microphone—held in the hand or slipped into a plastic desk stand—and transferred to the oxide-coated paper by the magnetic recording head which traverses the cylinder supporting the recording sheet.

Fitting the paper Dictograms is

a simple operation that only takes a few seconds. Messages are erased "by over-speaking" or with a permanent magnet, and the sheets may be used again and again; they can also be mailed or filed for reference. Twelve minutes of dictation (1,500 to 2,000 words) will go on a single sheet. A pointer linked with the recording head,

gives an exact indication of progress and immediate forward or back spacing.

There are two volume controls on the Dictorel; one varies the strength of the output to the loud-speaker or the lightweight stethoscope head-set, and the other controls the input volume to the recording head. This input control is a unique feature and makes it possible to cut out background noise so that dictation can be given in a noisy office without raising the voice or straining the transcriber's hearing when it is played back.

The danger of starting dictation before the instrument has

The Dictorel, with microphone and back spacer.



EQUALLY SUITABLE

for the smaller factory

M16 TIME RECORDER

- Super-fast automatic recording by simple one hand operation.
- Single or two colour printing.
- Automatic time signals.
- Can be controlled from mains or master clock.

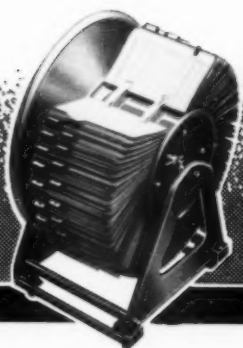
We invite enquiries on any problem relating to the indicating, measuring or recording of time electrically.

THE MAGNETA TIME COMPANY LTD.

GOBLIN WORKS • LEATHERHEAD • SURREY
LONDON OFFICE 6 GREAT QUEEN STREET

ASSTEAD 966 (8 lines)
W.C.2 HOLBORN 9762-9763





RECORD CONTROL

CARDWHEEL is the speediest, easiest—and most efficient of all Reference and Recording Systems!

CARDWHEELS are compact, complete and flexible—cards can be quickly inserted or removed without disturbing the proper sequence of the remaining cards.

CARDWHEELS can be used for ANY card index application where speed of reference and posting is required. Entries can be posted DIRECT on to both sides of the card WITHOUT REMOVAL.

CARDWHEEL Models are available for card sizes 4" x 2", 5" x 2", 5" x 3", 6" x 4" and 8" x 5". Your existing cards can be transferred to CARDWHEEL without any expensive change-over.

by

'CARDWHEEL'



C. W. CAVE & Co. Ltd.
56 HOLBORN VIADUCT, E.C.1.
CENtral 3778 9

Represented in Leeds, Manchester, Sheffield, Brighton and Rochester.

SEPTEMBER, 1951

**Does not
disturb**



*Model '160' Express
with automatic inking*

Start a Gestetner 160 . . . and listen.

What do you hear? A faint hum, a slight clicking as the copies—each one perfect—slip into the receiving tray. This Gestetner is a silent worker, and silence is golden in a busy office where sound distracts . . . destroys concentration . . . impairs efficiency.

But silent working is more than a useful feature. It is a mute—though eloquent—witness to the superlative design and assembly, high quality materials and painstaking craftsmanship that go into every Model 160.

Gestetner

THE WORLD'S LEADING
 DUPLICATOR SPECIALISTS

GESTETNER LTD., ALDWYCH HOUSE, LONDON, W.C.2
 Holborn 8700

warmed up has been eliminated, as the "on" lamp does not light up until the valve filaments, etc., are heated and functioning properly.

A range of well designed foot, hand or knee operated controls enables the recording to be stopped, re-started or back spaced at will. A button on the microphone also acts as an on/off switch. A sensitive "telephone reporter" will record both sides of a telephone conversation when laid on a desk near the instrument stand.

The *Dictorel* is enclosed in a one-piece, dark green moulded plastic case; a plastic dust cover and a solid leather carrying case are available as extras.

—(Enquiry Ref. No. 09/7.)

Introducing the Scribe

LIGHTNESS, strength and versatility; all these virtues have been incorporated in the new *Scribe* portable typewriter without the sacrifice of a single feature of the standard office machine.

Key-set tabulator, touch adjustment, variable line spacing, automatic paragraph indentation, ribbon-colour and stencil selector are all standard fittings. The writing line is 8½in. long on paper up to 9½in. wide.

Elite, Pica or Bodoni type faces are available on the 86-character



The *Scribe* portable and its woven plastic case.

keyboard. Non-glare plastic keys, a dull grey finish and segment capital shift protect the operator against eyestrain.

The *Scribe* weighs only 8lb. and is supplied with a handsome carrying case made of *Tygan* woven plastic material in nigger and grey stripes. Machines are at present being imported, but plans are well advanced for their manufacture in this country.

—(Enquiry Ref. No. 09/8.)

Continuous Addressing

A NEW attachment for feeding a card from a continuous roll into an addressing/listing machine and cutting up the printed slips, is rapid and economical in operation because it eliminates the need for fan-folded, prepared forms and does away with the tearing and sorting of the printed parts.

A continuously running electric motor, connected to a driving roller, draws the card forward when actuated by a series of



**Your staff's best aid
to quick action
and efficiency**

STRONG, tough metal inner and outer bridge-pieces—files cannot be crushed or damaged.

QUICK colour-index systems for rapid, foolproof identification.

EASY replacement of obsolete files takes only a few seconds.

SAFE—Nothing to go wrong—nowhere for loose papers to get lost. Files cannot get out of order.

MILNERS
STEEL
EQUIPMENT

Milners fully descriptive leaflet will interest you. Write for a copy to:

MILNERS SAFE COMPANY LTD.

Head Office: 58, HOLBORN VIADUCT, LONDON, E.C.1.

Telephone: CENTral 0041-5.

Telegrams: Holdfast, Cent. London.

BAR-LOCK

For speed and efficiency

MODEL No. 22

with Key-set tabulator

Bar-lock Typewriter Company, Nottingham

Telephone 75141-2 Telegrams: Bar-lock, Nottingham



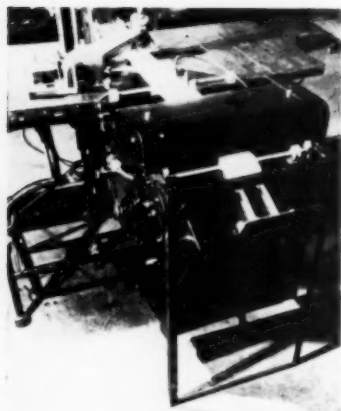
consider the saving..

With the
“ELLIOTT”
ADDRESSING AND LISTING MACHINE
envelopes—bills—statements—postcards—
wrappers—labels, etc. can be automatically
addressed at speeds up to
3,000 per hour!
with ABSOLUTE ACCURACY, and
VISIBILITY of operation!

Wages, Dividend and Annual Return Sheets, Rate
Sheets, Warrants, etc., are a few of the tasks for
which these machines have been specifically designed.
Nearly fifty years of experience is available, to simplify
any problem you may have, and YOUR problem is a
matter of vital importance to us from the moment we
receive your letter or telephone enquiry.

THE HAYWARD COMPANY
(Addressing Machines) LTD.
62, BRITTON STREET, LONDON, E.C.1.
CLERKENWELL 5961-2.

electro-magnets connected to the printing arm of the addressing machine. The amount of feed is controlled by the diameter of a wheel which is turned by the card and which interrupts the feed and operates the guillotine once per revolution. A variety of different



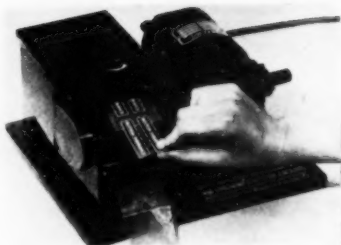
The delivery end of the addressing machine feed device.

diameter wheels is available for varying the throw of the machine. Photo-electric control can also be fitted; black spots (or holes) in the card are sensed by a light-sensitive cell which then operates the feed device and the guillotine. An advantage of this method is that where necessary the amount of feed can be irregular.

Both parts of the attachment—the support for the paper reel and the feeding and cutting device—can be fitted in half an hour to any make of addressing machine. No modifications or electrical connections are necessary: co-ordination of feed is achieved by mounting a mechanical switch where it can be actuated by a reciprocating part of the printing arm. There is, therefore, no feed—and thus no waste of paper—when the parent machine is not printing from every plate.

The cut slips are delivered in their correct order by conveyor tapes which stack them in a delivery chute.

—(Enquiry Ref. No. 09/11.)



Label feeding by electricity.

Label Dispenser

AN electrically operated dispenser enables the feeding of self-adhesive labels to be greatly speeded up. The labels are an American invention and are manufactured in this country under licence. They require no heat, moisture or gum; finger pressure is all that is necessary to make them adhere to the surface to be marked.

The new electric machine is entirely British in design and manufacture and is operated with a foot-switch. A built-in motor,

Organise!

Papers of a transitory nature that must be at hand need not lie untidily on your desk or place of work; keep them within arm's reach indexed and organised in the

VETRO Organiser

Twinlock
SYSTEMS

PERCY JONES (*Twinlock*) Ltd., 37 Chancery Lane, W.C.2.

Tel.: CHAncery 6971

du-al

Correct Posture

CHAIRS



C.A. 146. De-Luxe typists Swivel Posture Chair (embodying new floating nut assembly, Pat. pending). Floating back support with spring adjustable tension and vertical adjustment.

IC. 121. Super De-Luxe Executive Armchair. Revolving with automatic sliding seat and pivoting backrest. Self-adjusting to correct height. Wide arm-rests with sponge interior.



B. 51. Cantilever Chair. An all purpose office chair. Curve-shaped padded seat and back.

Write or phone today for illustrated catalogue.

Manufactured exclusively by

DARE-INGLIS Products Ltd.

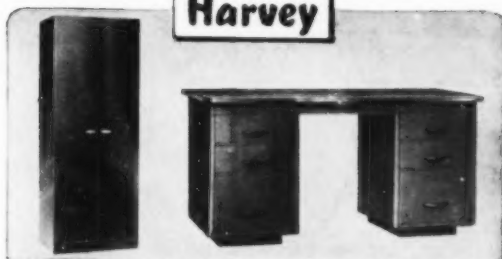
"DU-AL" HOUSE,

BYRON ROAD, HARROW, MIDDX.

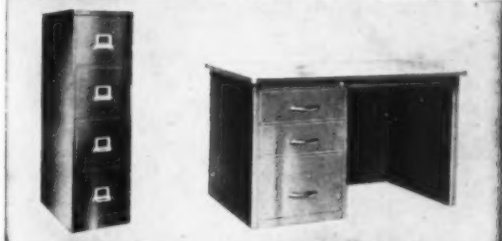
Telephone:
HARROW 5141-2-3-4

Telegrams:
DU-AL HARROW.

Harvey



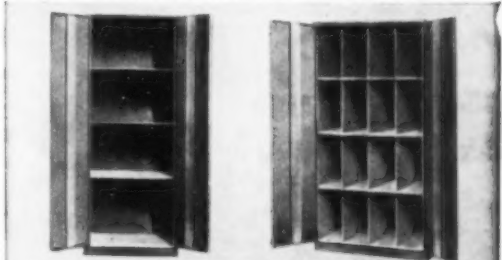
STEEL CUPBOARDS AND DOUBLE PEDESTAL STEEL DESKS.



STEEL FILING CABINETS AND STEEL TYPISTS TABLES.



STEEL CUPBOARDS WITH SLIDING DOORS.



STEEL CUPBOARDS WITH SHELVES OR PIGEON HOLES.

All Harvey Steel Office Furniture and Equipment is of modern design, sound construction, and of the highest quality. Finished in Olive Green stoved enamel it is perpetually durable, fire-resisting, and proof against damp and vermin. Prices are competitive. Send for Catalogue No. BU800

Harvey

G.A. Harvey & Co. (London) Ltd
Woolwich Rd. London, S.E.7

and controls for stop, start and variable speeds are provided. Machines can be supplied that deal with special sizes, shapes or combinations of labels.

—(Enquiry Ref. No. 09/14.)

Dual Role Tray

NOVEL in design, the new Posting Box is a tray for posting records, that also folds



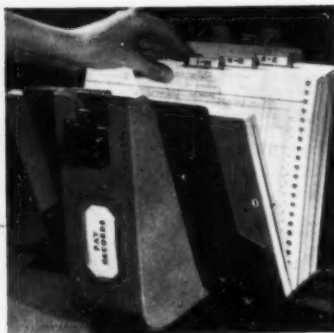
In a few seconds this locked box becomes the posting tray on the right.

up into a neat, double-locked case for storing confidential or valuable documents.

When opened, the rigid "V" design is ideal for posting or reference and clear index tabs further simplify these operations.

Rubber feet prevent the tray from slipping and scratching tables or desks and the light alloy construction makes the box as easy to handle as an ordinary ledger.

Three sizes are available to take records up to 14 ins. wide and 11



ins. deep. Facilities are provided for "off-setting," and special rubber padding prevents the cards from slipping when in use.

—(Enquiry Ref. No. 09/6.)

Staff Locating Clocks

INEXPENSIVE to install because it makes use of existing wall clocks, the *Man-Hunter* staff locating system consists of a control unit which illuminates the figures on the clock faces with steady or flashing signals either singly or in combinations.

Switches on a control box are numbered to correspond with the dial figures and these are depressed one at a time or together. Any or all the numerals on the clocks can be used; four numerals give 15 combinations, five give 31, whilst if all 12 are used over 4,000 combinations become available.

Separate numbered call lights can be installed in departments where there is no clock.

—(Enquiry Ref. No. 09/10.)

NU-SWIFT LTD.

World-wide recognition of pressure-operated Fire Extinguishers

At the 18th General Meeting of Nu-Swift Ltd., held at the Nu-Swift Factory, Elland, Yorkshire, Mr. A. Harland, the chairman, who presided, said:—

"Never in the history of the Company have so many fires been put out by Nu-Swift pressure-operated extinguishers as during the last year. Output, sales, and profits all reached fresh high levels. We rejoice at the signal honour graciously conferred by His Majesty the King upon our Contracts and Factory Manager, Mr. E. E. C. Cawood."

"The merits of our products were strikingly acknowledged during the year by the decision of the Royal Swedish Navy to standardize Nu-Swift pressure-operated extinguishers in the same way as our extinguishers are already on guard in 'Every Ship of the Royal Navy.' The Swedish Navy is the 11th Navy to standardize Nu-Swift."

"Thanks to our policy of pressing on with research and development, Nu-Swift extinguishers continue to find a large and growing market abroad. Our standard products are specified and operate with efficiency all over the world. Under arctic conditions they are used in the Spitzbergen collieries near the North Pole. In tropical countries Nu-Swift is giving equal satisfaction in Africa, Asia, America and Australia under trying and exacting climatic conditions. The name of Nu-Swift is now registered as our trade mark in 62 countries. Export sales last year exceeded the total of our home sales in the last pre-war year by 33.2%."

"To the civilian user in the Home Market we continue to give the closest attention. Through our extensive advertising campaign in 146 papers and trade publications in Britain, we ask the simple question: 'Fire! Where's your Nu-Swift?' More and more people have come to realise the immense advantages of standardizing for every risk,

NECESSITY FOR UP-TO-DATE FIRE PROTECTION

pressure-operated extinguishers, all operated in the common-sense upright position.

"We are the only manufacturers able to offer this up-to-date method of operation for every type of risk."

"Among our users are many of the leading industrial concerns, shipowners, transport undertakings, progressive farmers, a large number of municipalities and many shopkeepers and private individuals, apart from the nationalised industries, chief among which is the National Coal Board with its peculiar fire problems for which Nu-Swift extinguishers are particularly suitable."

"Last, but not least, a number of progressive Fire Brigades carry Nu-Swift on their engines. But why wait for the Fire Brigade to bring along Nu-Swift? Everybody has a fire risk. For the first five minutes any man's fire is his own, and the cost of providing pressure-operated Nu-Swift extinguishers is small compared with the prospective loss of life and property through fire."

"Production has been maintained at a high level and the shortage of raw materials has not hampered us unduly, thanks to the collaboration of our many suppliers and the Government Departments involved, all of whom recognise the essential nature of our products. Most of our models can still be delivered promptly and we plan to increase production still further. Should the international situation deteriorate, it may be difficult for us to cope with all demands. It behoves, therefore, everybody to check or have checked whether his or her fire fighting equipment is up-to-date and adequate in number. War or peace, the risk of fire will always be with us."

On the proposal of the managing director, Mr. F. Graucob, the retiring director, Mr. A. Harland, was re-elected and the report was adopted.

NU-SWIFT

IN EVERY SHIP OF THE ROYAL NAVY

The World's Fastest Fire Extinguishers

ON SALE IN 32 COUNTRIES

*A thousand uses
for this versatile*

FOUNT^NBRUSH

in your works

NEW!

Limitless in its applications . . . easy to use . . . and with its own self-contained store of fadeless waterproof ink, the Flo-master FOUNT^NBRUSH cuts time and effort wherever quick, legible displayed writing or drawing is needed.

Ideal for use in Stores, offices, studios, factories, etc., for such widely differing purposes as advertisement layout on one hand and the addressing of parcels on the other.

Thickness can be varied between a hairline and a width of $\frac{1}{8}$ " and the smooth, even, automatic valve feed controls ink-flow to a nicety, merely by degree of pressure . . . and it's so simple. Everyone can find a use for it, even the Managing Director.

Order a Flo-master NOW . . . try it out in the various branches of your business—and you'll be back with a bulk order!

Stocked by your usual stationer or artists materials dealer. If you have difficulty in obtaining the Flo-master write to the manufacturers—Cushman & Denison Co. Ltd., Dept. G, 142/144 Cannon Row, London, S.E.5, enclosing extra 6d. for Reg. Post.

Flo-master
BRITISH MADE
FOUNT^NBRUSH

Trade and Export enquiries to:
BLICK OFFICE EQUIPMENT LTD., LONDON, S.E.5

SEPTEMBER, 1951



VARI-TYPER

THE OFFICE COMPOSING MACHINE

SAVES TIME AND MONEY

HERE is a composing machine which justifies lines automatically, has instantly interchangeable type founts, makes perfect "masters" irrespective of the operator's touch—yet works as easily as an ordinary typewriter.

SEVERAL hundred different type faces are available, ranging in size from 6-point to 18-point, including italics. There are also complete founts for foreign languages, mathematics, chemistry and other special symbols—each one fitted at a twist of the wrist.

WHATEVER your method—stencil, direct plate, photo-litho—the Vari-Typer, used in conjunction with your stencil or offset duplicator, will effect a substantial reduction in your printing costs—quite apart from the saving of time and composing charges normally involved.

Vari-Typer

VARI-TYPER DISTRIBUTORS (GREAT BRITAIN) LTD.
ALDWYCH HOUSE, LONDON, W.C.2. HOLBORN 2014

Short Cuts to OFFICE EFFICIENCY

Starting a Junk File

ALL office systems work admirably when it comes to handling routine documents. It is the annoying habit that some documents have of not falling within the tenor of any particular pigeon-hole that sends the system awry.

Such papers are usually a problem; it is rarely safe to throw them away, but at the same time it is difficult to know how to dispose of them. Filing takes valuable time and space that may well be wasted.

One solution, carried out by Dexion, Ltd., is unconventional but thoroughly practical. It consists of a "Junk" file maintained by each executive.

The file is usually a large subdivision of the main drawer of

his desk, or even a separate drawer large enough to take foolscap sheets and about four inches deep. Into this file go:—

- (1) Papers that to all intents and purposes are finished with.
- (2) Papers, catalogues, publicity matter, etc., of doubtful value.
- (3) Odd notes, records, etc.
- (4) Papers which though possibly of value in the immediate future will certainly be obsolete in a month's time.
- (5) Papers which should be reviewed within a month.

Once a month or thereabouts, the contents of this "Junk" file are tipped out on to the desk and gone through carefully. On the average, 75 per cent. of the material can

now be safely scrapped. Some of the remainder may need attention, or to be sent for permanent filing. A certain amount can be returned to await next month's clearance.

The advantages of this unconventional approach are:

(a) the file provides a safe place for all the odd papers that one cannot really decide what to do with and which in the ordinary way would clutter up the desk.

(b) it automatically brings up papers for periodic reviews.

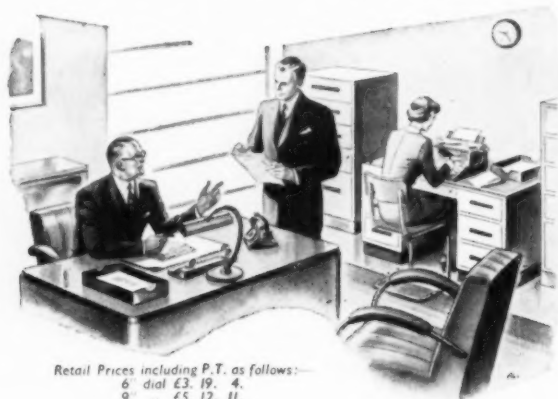
(c) the review of all these papers at the end of a month brings up all sorts of useful ideas and reminders.

Cutting Typing Fatigue

OFFICE desks tend to come in standard sizes; office typists do not. To adjust a desk permanently for a girl who may leave next month is not good business, but one firm has got over this by the provision of typewriter "lifts," i.e., solid wooden blocks to go on top of the desk to lift the typewriter to the required height.

These lifts are tailor-made in the company's own carpenter's

The Modern Clock for the Modern Office



Retail Prices including P.T. as follows:—
6" dial £3. 19. 4.
9" " £5. 12. 11.
12" " £6. 11. 2.

No clock could be more in keeping with the modern office than the Smiths 'Sectric' Delhi, with its clear, easily read dial and smart

but dignified appearance. It is one of the most popular wall clocks in the Smiths 'Sectric' range. Available with 12", 9" and 6" dials.



The
Delhi

SMITHS 'SECTRIC' CLOCKS



SMITHS ENGLISH CLOCKS LTD Sectric House, London N.W.2. The Clock & Watch Division of S. Smith & Sons (England) Ltd.

WHERE TO BUY DURING SHORTAGES!

KEEP A VISUAL RECORD OF ALL SUPPLIES
BY PRODUCT, BY AREA

FULL DETAILS ON REQUEST

To cope with present day difficulties of material shortages a special system has been created for controlling Purchases. Each record is visibly separate, the overlapping edge summarising the story on the record. This edge tells you all you want to know at a glance. And if you wish to pin-point special items, coloured signals do just this—pointing out urgent materials, supply positions, etc.

There are standard Shannoleaf records to meet all needs. Equally, records can be designed specially to your instructions. Whichever you have, you have a *streamlined* system—the speediest for reference, the fastest for entry. One clerk can handle thousands of such records. Why? Because the binders are streamlined to slide instead of lift; the mechanism is so simple it permits a record to be taken out or put in at a second's notice. And the whole system is designed to save space,



time and clerical labour—whether the records number hundreds or tens of thousands.

Just write "Shannoleaf for Purchasing" on your letterheading and full details will be sent you by return.

STANDARD RECORDS

Purchase - Hire Purchase - Sales -
Sales and Purchase - Stores and
Stock Control - Plant and Machinery -
Case and Container - Personnel.



Shannon Systems

FIRST IN FILING

The Shannon Ltd.
97 Shannon Corner,
New Malden, Surrey.

ABIX
CYCLE STANDS

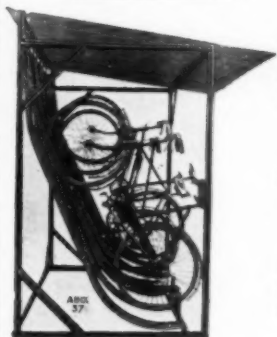
THE HOME OF THE
BRITISH CYCLE.

The most efficient
method of storing
cycles.

The type illustrated
is only one of the
many which we
manufacture.

Fully illustrated cata-
logue on request.

All stands are of
steel, rust-proofed
and stove-enamelled
green.



TYPE A

ABIX (METAL INDUSTRIES) LTD
FACTORY EQUIPMENT SPECIALISTS
TAYBRIDGE WORKS, TAYBRIDGE ROAD,
BATTERSEA, S.W.11.

Phone: BATtersea 8666/7.

Grams: Abix, Batt, London.



"The Airflex-Sunuminium" Venetian.

As fitted to the Drawing Offices, Workshops and
Offices of many of Britain's Leading Industrial
Concerns.

Perfect Light Distribution.
Serviceable. Reasonably Priced
and most attractive.

Stoved polished ivory, and other tints.
Flexible Aluminium slatting.

EVERY'S EST. 1834 "Britain's Leading Blindmakers"
81 Great Portland Street, London, W.1

Ask for sample and leaflet.

shop. By having typewriters set at the right level for each girl, fatigue has been reduced and output increased. Energy is better spent on productive work than on compensating for muscle strain imposed by an effort to fit where one does not fit.

Correcting Stapled Papers

THE usual practice when corrections have to be made on papers that have already been stapled together is to unstaple the pages in order to insert the individual pages in the typewriter.

This is unnecessary. If a piece of quarto paper is inserted into the typewriter and rolled into position so that it projects about one inch above the front scale, the individual sheet on which the correction has to be made can be pushed in between the quarto sheet and the roller. The roller can then be reversed until the sheet is in position for typing the correction. By thus working from the bottom, the need for unstapling is avoided.

Recording Machine Applications

TAPE and wire recording machines have many uses other than their straightforward purpose for dictating letters, etc. Some additional applications of these machines are given below, although this is by no means a complete list.

1. Recording personnel interviews. This is especially useful when the tone of the applicant's voice is an important factor.
2. Recording interviews with customers which can form the basis of market research into current or new products.
3. Recording management messages, or meetings between management and employees.
4. Recording commentaries for film strips or slides which can be used for training sales staff or other instructional work.
5. Recording the noise level of machines in order to check on quality or to establish new and better designs.
6. Recording details of new

products which can be used by salesmen in connection with the products themselves or, alternatively, with models, photographs, drawings, etc.

Colour in Stationery

COLOURED paper is widely used in offices for differentiating purposes. It has other uses. An American manufacturer who tested coloured envelopes to determine the number of responses to a direct mail advertising circular found that blue envelopes brought 7.8 per cent. responses, yellow 6.8, goldenrod 6.4, green 6.0, pink 5.8 and white 3.1. Another study in which colours were measured in terms of the percentage of orders they produced gave the following results: goldenrod 21.4 per cent., pink 17.8, green 17.8, white 17.3, and kraft 15.9.

Another study by a milling company while testing "return cards" showed that 50.6 per cent. of the returns were cherry red, while white and blue pulled 32.7 and 16.7 per cent. respectively.

PENSION SCHEMES

WITH PROFITS

A new development

For particulars apply to

THE PRUDENTIAL ASSURANCE CO. LTD.
HOLBORN BARS, LONDON, E.C.1

Illustrated printed matter from your own machine

*The scope, simplicity and
economy of the latest
office equipment.*

TO the average businessman, office printing means little more than running-off a few letters on some form of duplicator. Anything more ambitious such as photographically illustrated brochures or colour work is frequently dismissed as being impracticable or too complicated.

Yet the Rotaprint, a very simple process, is available to the commercial business house and is so versatile that almost any print job in the office comes within its scope.

The great thing about this small office plant is the sense of having all your routine printing under your own control. All jobs are on easily

filed, thin flexible plates ready to run off copies at a moment's notice, whether the quantity be 50, 500, or 5,000. The convenience is outstanding!

It really would pay you at least to find out a little more about the advantages of handling your own print. But the essence of the matter is to get into good hands from the beginning.

For expert initial advice, free from extravagant claim and without the slightest obligation consult Kaye's Rotaprint. **BE SURE ABOUT THIS**, for Kaye's have the visible backing of extensive factories in Hendon, N.W.9, with skilled personnel built up during 25 years intensive development of the Rotaprint Machines and Process.

Drop a line now to **KAYE'S ROTAPRINT LTD., ROTAPRINT HOUSE, HONEYPOT LANE, LONDON, N.W.9**, or 'phone an enquiry to **COLINDALE 8822 (12 lines)**.

CARTONS DISPLAY BOXES

AMHers



3261/4

ESTABLISHED 1888

*Experience
Counts!*

BRITANNIA FOLDING BOX CO. LTD.
DACE ROAD . OLD FORD . LONDON

(By very kind permission of "THE EVENING STANDARD")

NEW AND
SLIGHTLY
USED
OFFICE
EQUIPMENT
OF EVERY
DESCRIP-
TION



ILLU-
STRATED
LITERATURE
GLADLY
SENT TO
YOU UPON
REQUEST

— We also cater for individual tastes — may we have the pleasure of knowing your particular requirements?

OFFICE FURNISHERS LTD.

(Late of George Street, Baker Street. W.1.)

EVERYTHING FOR



THE OFFICE

30 HOLLY PARK, LONDON, N.3.

FINchley 1684

IBM Expansion— Comprehensive Programme

A COMPREHENSIVE programme has been established covering International Business Machines factories in Britain, Canada, France, Italy, Germany, Brazil and other foreign countries, by which a maximum of co-ordination is achieved and each unit supports the others.

Last year, IBM World Trade Corporation, the wholly-owned but independently operated subsidiary of the International Business Machines Corporation, which handles all IBM business outside the United States, produced 68 per cent. of its accounting machine requirements as compared with 52 per cent. in the previous year. Britain, Holland, Belgium and Switzerland are now assembling IBM electric typewriters and Sweden was scheduled to start in June.

Training of the operating personnel for the new factory at Greenock, Scotland, is well under way. The new IBM plant at Toronto, Canada, which adds 123,000 square feet of manufacturing floor space to the IBM

facilities there, is in partial operation, serving both Canada and other countries.

A programme has been set up for establishing IBM accounting machine business in other British Commonwealth countries in which it had previously operated only its time-recording and typewriter business. Representatives have been trained and located in India, the Union of South Africa and Australia.



The illustrations above show two recently opened office equipment showrooms in London. On the left is the new headquarters of British Olivetti Ltd. in Berkeley Square. On the right, the new offices in Albermarle Street, of the Monroe Calculating Machine Co. Ltd., which were opened in May this year.

THE

Ewerest TYPEWRITER

(STANDARD AND PORTABLE
EARLY DELIVERY)

- Key set tabulator for invoicing™
- Half line spacing
- Interchangeable carriage
- Light and responsive touch



WRITE FOR ILLUSTRATED LEAFLETS TO:

**T. S. (OFFICE EQUIPMENT)
LTD.**

30 NEW BRIDGE STREET, LONDON, E.C.4.

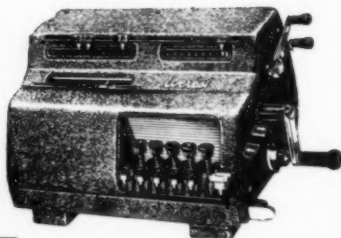
Telephone: CITY 1107-9

E

Ewerest

CALCULATOR

- Key Set Operation
- Silent-Speedy
- Simple to operate
- Internal carriage
- 13 column capacity



THAT'S BETTER!



Says the Book-keeper...

Siemens 'SIERAY' Fluorescent Lighting has made all the difference. 'SIERAY' lamps with 'SIERAY' fittings give better light for half the consumption of current. You can choose from a wide range of attractive designs for your office, store, factory or board-room. Fully descriptive leaflet on request.



FLUORESCENT LAMPS AND FITTINGS

SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED
38/39 Upper Thames Street, London, E.C.4.
Branches in principal cities.

SEPTEMBER, 1951

Take a seat...



if it's

it will make all the difference

The range of Evertaut chairs is wide enough to seat practically all workers of all trades and vocations. Great research has gone into the designing of each model with the view to giving correct posture and anatomical support at all times, thus reducing to a minimum the fatigue which costs employers so many productive "Man hours".



B.S.72. A comfortable, well padded, sturdy chair with full three point adjustment, height of seat from 17" to 22", backrest and angle of backrest.



B.S.24. A chair specially designed for the draughtsman and the telephonist, giving the additional height and correctly placed tubular footrest so necessary to good posture and comfort.

Please write for catalogue "A"

OFFICE & WORKS SEATING

WE ALSO MANUFACTURE:

SHELVING * CUPBOARDS AND LOCKERS * WORK TRAY STORAGE SYSTEMS * PLANFILE CABINETS * CANTEEN EQUIPMENT * OFFICE TABLES

WALSALL ROAD, PERRY BARR, BIRMINGHAM, 22b.

Phone: Birchfields 4587 (4 lines)

Grams "Evertaut Birmingham".

London Office: Kern House, Kingsway, W.C.2, (HOL. 0238).



In the past three issues, **BUSINESS** has described how three large firms have tackled the problem of waste prevention. In this feature we conclude the series by pinpointing the methods of five more firms who are out to save waste.

By C. BRYANT

How Five Firms Have Tackled Waste Prevention

IN the past three issues, **BUSINESS** has published at least one feature describing methods of waste prevention in individual manufacturing concerns. Although these articles have discussed the subject from different points of view, one argument has been common to them all; that waste prevention is not a task to be reserved for periods of crisis; it is (or should be) an integral part of business efficiency at all times and in all circumstances.

Unlike its predecessors, the article that follows has been built on a number of case histories, each of which describes one aspect of waste prevention. It would be more satisfactory—and much more just—to give a full account of all the methods adopted in these concerns. But **BUSINESS** has its own material problem, which is shortage of paper.

(1) New method saves 1,000 sq. ft. of steel every week.

In order to save metal as much as possible, Leyland Motors, Ltd., adopt manufacturing methods for

some components which, under normal circumstances, would be considered uneconomic. One typical example is a new method used for the manufacture of the frame brackets for the Leyland underfloor-engined *Royal Tiger* models. Flanges previously shaped with the pressings are now welded into position thus saving 1,000 sq. ft. of steel plate each week, whilst maintaining the strength of the component.

In the bodybuilding factory, plywood panels are to be used instead of aluminium for lining parts of the sides and roofs of buses. A considerable saving in aluminium will also result from the installation of a new 600-tons double-action forming press, the delivery of which has coincided with the metal-saving drive. It will produce in a single operation, and from less material, the aluminium panels for cab roofs, and front and rear roof domes for single and double-deck buses. These were previously fabricated from separate sheets.

The company is also seeking the co-operation of every employee throughout the works by inviting them to submit their ideas on

where metal can be saved. Payment is made according to the practical value of the suggestions adopted.

(2) Breakage bonus saves material and money.

Two years ago, Ismay Lamps, Ltd., examined the whole question of lowering costs. They decided that the only approach left open to them was to cut material costs by reducing shrinkage. Over the years they had come to accept certain figures of material shrinkage as normal. The plant was run by a skilful and loyal team, but the general attitude towards raw materials was one of indifference. It was therefore decided to introduce a short but intensive propaganda campaign stressing the value of materials. In addition, a breakage bonus was offered as a special incentive.

The breakage bonus was additional to normal wages, and every employee who had any influence over shrinkage—inspectors alone being excepted—was brought into the scheme. Operators, charge hands, foremen and maintenance engineers took part. The scale varied from 5/- per week for girl

Above, new half coil winding at Brook Motors, Ltd.

operators to 15/- per week for maintenance engineers. The starting point was the lowest material shrinkage ever recorded for each type of material. Only improvements on these figures qualified for bonus.

The results exceeded all expectations. Many production groups—there are teams operating in 10 production lines—reached the full 5/- bonus for all female employees week after week. In spite of the increase in wages, the all-in cost of the lamp decreased appreciably. And although the opposite might be expected, production went up slightly—because of the reduced number of breakages halting the production line. Some hundreds of pounds worth of material were saved every week, and the bonus system is now a permanent feature of the organization.

(3) Research teams find the weak spots.

In an endeavour to combat considerable excess waste at their thread mills in Britain and abroad, J. & P. Coats, Ltd. have met with marked success. During campaigns at several mills the excess waste has shown a very definite drop; it has been common to find the wastage figure reduced by 50 per cent. while, in one instance, there was a reduction of 88 per cent.

Last year the company established their own research teams to investigate waste in the various departments. These teams have two main lines of approach. First an overall general investigation merely to determine the actual percentages of waste being made; secondly a check on the waste returns being made by the various departments.

If these figures approach the recognized standard, no immediate action is required. But if they show a considerable excess over the standard, a detailed examination is made by the research team. Each ounce of waste is checked, the cause determined, and a check made of the waste coming from each individual worker. Thus a comprehensive picture is obtained

showing where the waste is made and how it can be reduced.

As similar processes are carried out at a large number of factories both in this country and abroad, the results are interchanged. This enables managements at all factories to take full advantage of the available information.

(4) Good alternative materials can be found.

At Brook Motors, Ltd., rotors have normally been made up by inserting a series of copper bars into the electrical laminations and welding a copper short-circuiting ring at each end. Shortage of copper has necessitated economies which have been achieved by devising a new and special method of casting the rotors with aluminium instead of copper. Efficiency is equal in every way to the bar type rotor.

An overall economy in sheet steel was accomplished by stamping out fans from 18 s.w.g. gauge with additional stiffening, in place of 14 s.w.g., thereby enabling the same number to be obtained from the reduced allocation. Comparative costs of these fans were 14 s.w.g. 16.6 pence, against 18 s.w.g. 4.18 pence.

On the production side, many economies have been effected by the use of new equipment and methods. The wire coils which are

preformed on special machines are now formed in larger sets at one operation; where four or six coils were formed, it is possible to produce twelve, and a simple movement releases the complete set instead of the previous method of dismantling the former plates.

In the actual winding operation, by which the coils are dropped into the insulated stator slots, time has been saved by the introduction of a half coil series winding. Larger numbers of coils are used in each set, and as they are already linked together, a saving of time and material is effected by cutting out most of the connections that followed completion of the winding. This method has resulted in savings on the weight of material (copper wire) as follows. The old full coil winding weighed 20lb., the new half-coil series-winding weighs 17lb. (A 5-h.p. motor at 1,000 r.p.m. has been taken as an example for this purpose.)

Savings in insulating varnish have been made by using pack windings which are inserted into the cast iron stator frame after the whole processes of winding, connection and impregnation are completed. In the previous method the windings were inserted into the stamping pack ready fixed in the motor frame, and the com-

How Vital Materials Were Saved

- 1. LEYLAND MOTORS LTD.** Metal saved by adopting new manufacturing methods, using new equipment and seeking the co-operation of employees.
- 2. ISMAY LAMPS LTD.** Intensive propaganda campaign started and a breakage bonus introduced. Hundreds of pounds worth of material saved.
- 3. J. & P. COATS LTD.** Research teams appointed to investigate excessive waste—right down to the individual worker. Wastage figures reduced by 50 per cent.
- 4. BROOK MOTORS LTD.** New manufacturing techniques and equipment used and different metals substituted without loss of quality.
- 5. DEXION LTD.** Scrap reports introduced which enable a check to be made on the total scrap for each worker, department or machine.

pleted job was then immersed in insulating varnish and passed through the baking oven—the cast iron frame taking up an appreciable amount of varnish which served no purpose.

Savings in cable have been effected by fitting these to the terminal boards before the motor connections are finished. The previous method of completing connections and bringing cable ends out of the frame for subsequent connection to the terminal board meant that lengths of cable a few inches long had to be cut off to waste before being wired up.

(5) Report system cuts scrap, breakdown by 75 per cent.

Dexion Ltd. use reports to control scrap and breakdown. Each time a job is scrapped, a breakage occurs on a machine, a serious error is made, or a long delay is encountered, the foreman makes out a scrap report in consultation with the worker concerned. Forms are prepared in triplicate. One copy is handed to the worker; one is retained by the foreman; the third is placed in a central file.

SCRAP, HOLD-UP, AND BREAKDOWN REPORT

JOB MACHINE SHOP HOLD-UP

DATE AUGUST 3, 1950

NATURE OF TROUBLE

(Quantity of scrap, hold-up, or machine breakdown)
Blown fuse causing hold-up and loss of time

EFFECT (Give loss in time and money)

Section of works blacked out and shut down for ten (10) minutes. Estimated cost £5

CAUSE

Wires crossed in old bulb

These steps will be taken to prevent repetition

There is no way of preventing old bulbs blowing fuses but the following suggestion has been made to minimize loss of time. Out of ten minutes lost, eight were spent in hunting up the maintenance man, finding the fuse wire, and rewiring. It is therefore proposed that we standardize all our fuse holders and have a surplus already wired and available for replacement. One person will be responsible for seeing spares are always available

Signed

J. S. Brown

COMMENTS

Countersigned

Eric Lee

This principle of having duplicate available and standardizing certain equipment is a good one. A number of machine belts are being duplicated and kept in readiness for a breakdown

An example of Dexion's scrap, hold-up or breakdown report.

Sufficient details are entered to allow a later analysis to be made. Subsequent study may show that certain machines are costing more in repairs and replacements than is justified by their output. Details are given of loss in time and

money. Accurate entries enable a periodic total of the loss through scrap to be made; also the total of scrap for each worker, department, machine, etc. The cause is stated in specific terms. A positive solution is then offered.

The management of Dexion, Ltd. offer these suggestions to their key men for getting the most out of the system:

1. Go after minor errors as well as major ones. Encourage suggestions.
2. Weed out careless workers.
3. Keep a check on machines. Scrap reports will show which machines are repeatedly breaking down or causing hold-ups.
4. Write instruction sheets. Brief instruction sheets can be drawn up warning workers against recurring causes.
5. Use reports to train staff.
6. Keep departmental heads on the alert. If this scrap report system was used for nothing more than keeping executives and foremen more alert, it would still be well worthwhile.
7. Encourage suggestions. This gives employees something definite and useful on which to concentrate.

THIS WORKSHOP CHANGED TO DE LA RUE *RADIANT* HEATING and benefited 4 ways

- BENEFIT 1.** The De La Rue panels radiate heat directly to the workers, without warming the intervening air.
- BENEFIT 2.** Open doors and windows cause no reduction in the radiant heat available.
- BENEFIT 3.** Greater comfort of workers has led to increased output and fewer complaints.
- BENEFIT 4.** No time is lost in the mornings waiting for the building to "warm up"; adequate heat is supplied within a few minutes.

Ideal for

FACTORIES, LOADING BAYS, GARAGE WORKSHOPS, STOREROOMS, DRAUGHTY CORRIDORS ETC.



DE LA RUE

Industrial Type Space Heating Panels

Write for full details to:

Thomas De La Rue & Co. Ltd., (Gas Division) Imperial House, 84/86 Regent St., London, W.1. Northern Area: 4 Albert Sq., Manchester 2. Midlands Area: Portobello Works, Warwick

'ENGLISH ELECTRIC'

No smoke streams over the coaches of this Royal Scot. No boilers demand constant stoking. These 1,600 h.p. diesel-electric locomotives haul freight and passenger expresses with equal efficiency. Their diesel engines and electric equipment were designed and built by 'ENGLISH ELECTRIC'.



bringing you

All over the world 'ENGLISH ELECTRIC' trains and locomotives are bringing quieter, cleaner, more comfortable travel. All over the world, in all kinds of ways 'ENGLISH ELECTRIC' uses the power of electricity to bring better living to millions of people.



better living

The ENGLISH ELECTRIC Company Limited, Queens House, Kingsway, London, W.C.2

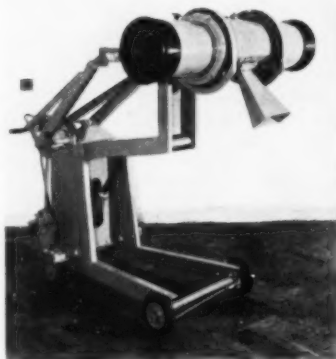
Survey of Modern **INDUSTRIAL EQUIPMENT**

ELECTRICAL EQUIPMENT

Seeing Through Steel

NON-DESTRUCTIVE inspection of engineering products for internal flaws with X-rays is now an established practice in many industries. The *Compactix* is a new industrial unit that is revolutionary in design and appearance, and the makers claim that it greatly simplifies and speeds up inspection procedures.

The transformers and the cathode ray tube are immersed in oil in a steel cylinder and the X-rays emerge through a window in the side of the cylinder. Water is used to cool the tube and transformers and an interrupter switch



The Compactix X-ray unit.

prevents the current being switched on until the coolant is

flowing; it also switches off the machine if for any reason the water supply is interrupted.

Normally the unit is connected to a water main but a "closed circuit" unit, mounted on a trolley, can be supplied for field work. A truck mounting, with hydraulic controls for raising and lowering the electron tube, is also available for factory use. Slings are fitted to the X-ray head so that it can be used independently of other supports in confined spaces.

The *Compactix* will penetrate up to three inches of steel and the X-ray unit is completely shock-proof and is unaffected by humidity; the operators are fully protected from any X-ray radiations.

—(Enquiry Ref. No. S.51/52.)

PUMPS AND COMPRESSORS

Mobile Air Supply

AN inexpensive compressor that can be fitted to the engine of any commercial vehicle provides

LOADS UP TO
3 cwt. are carried by the
LAMSON Type E
LOW LOADING
MOBILE SLAT
CONVEYOR

Write for full
particulars to
Dept. "D"



LAMSON

ENGINEERING CO., LTD. WILLESDEN N.W. 10.

Telephone: LAD. 2424

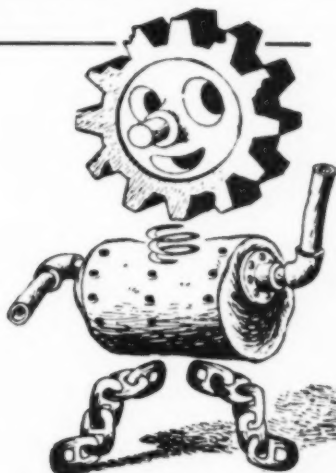
Telegram: KELYWIL, HARLES, LONDON

WANTED!

NEW STEEL

alias **JACK SCRAP**

(MAY BE IN HIDING OR DISGUISED)



Bring your detective powers to bear on the search for scrap and you'll probably unearth tons of it disguised as old plant you never use or hidden in out of the way corners of your warehouses, stockrooms and yards.

The new steel every industry needs can be made from the old steel it has done with. Find all you can. Round it up. Turn it in.

Your scrap merchant will help with dismantling and collection.

**Speed the
SCRAP
Speed
the Steel**

Issued for the **STEEL SCRAP DRIVE** by the
British Iron and Steel Federation, Steel House, Tothill Street, London, S.W.1

a mobile compressed air supply that can be used for inflating tyres, spraying paint, or driving small pneumatic tools. The M.O.4 compressor is driven from a pulley fixed to the dynamo shaft and it will supply 2½ cubic feet of air per minute at a pressure of 90lb. per sq. in.

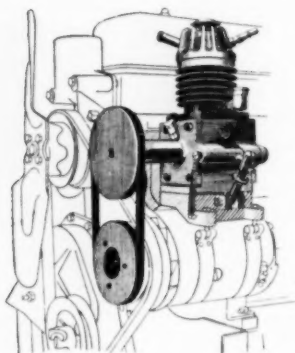
Total weight of the installation

including the compressor, a 30ft. airline, pulley drive and tyre adaptor is only 11lb. The M.O.4 can be fitted to any engine in half an hour and it can be engaged and disengaged at will. A gauge to indicate the air pressure is supplied.

—(Enquiry Ref. No. S.51/55.)

PACKAGING EQUIPMENT

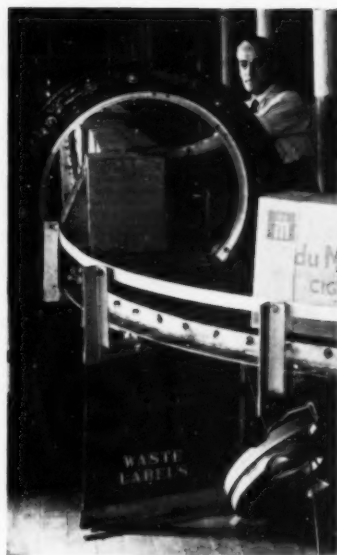
Automatic Wiring Machine



The M.O.4 compressor, strapped to the engine of a lorry.

A FULLY automatic wiring machine, which the makers claim is the only one of its kind in the world, presents an advance in the tensional steel strapping field.

Suitable for all types of packages and requiring no adjustment for containers of different sizes, the machine is fast acting and highly adaptable. Wire strapping can be placed in any desired position around the length or girth of wooden boxes, cartons, crates, etc.,



This fully automatic wiring machine is suitable for strapping any type of package.

in a matter of a few seconds—all automatically. Regardless of size,

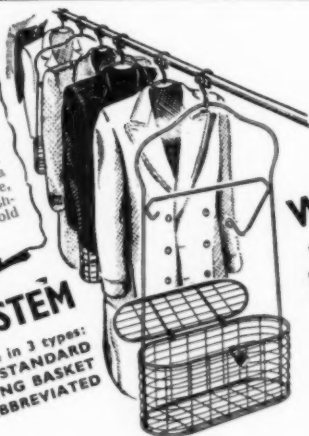


WORKERS SAY

Best thing yet—putting in that Hanger System—better than hooks or airless lockers. At last our wet clothes get a chance to dry in proper shape, aired ready to go home—without smelling like an old cupboard.

THE CLOAKROOM SYSTEM

Available in 3 types:
STANDARD
LOCKING BASKET
ABBREVIATED



Patent No. 415653
Reg. Design No. 789588

WITH ALL THE GOOD POINTS

MANAGERS SAY

By installing the SIEBER HANGER SYSTEM in our Cloakrooms we have re-claimed two-thirds of the space for production, and it has only cost us one-third of what we anticipated. There are no running costs and the workers' clothes are properly cared for in keeping with the New Factory Act. What is more—they all like it!



The sound principles underlying the SIEBER HANGER SYSTEM provide the answers to your cloakroom problems. Specifically designed to ensure the maximum use of space at lowest cost, SIEBER has a place for everything and, at the same time, allows the free circulation of air which dries damp garments.

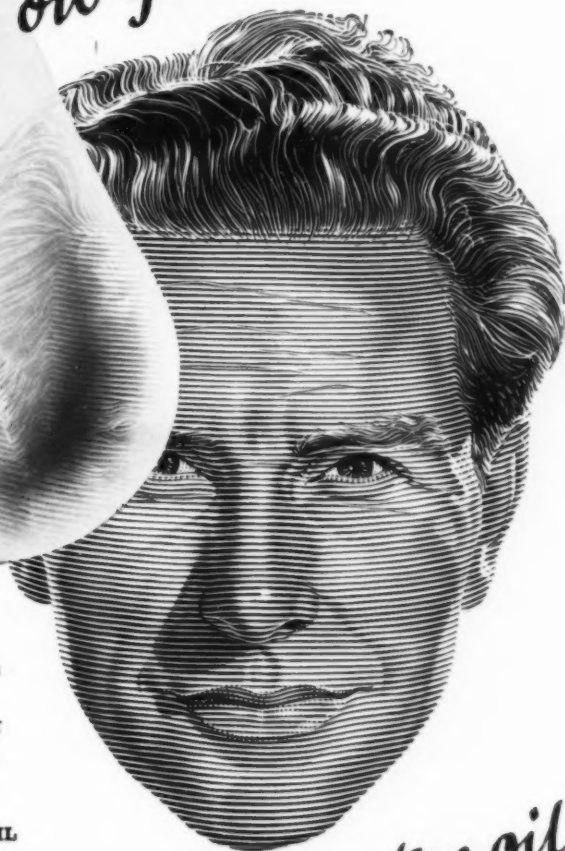
Readily installed in old and new factories. Satisfied users throughout the country.

Write or telephone TO-DAY for full information.

The SIEBER HANGER SYSTEM

JAMES SIEBER EQUIPMENT CO. LTD. Africa House, Kingsway, London, W.C.2. Tel.: HOLborn 5121-4531

Lubrication on your mind?



No need to blind you with science, sir. Nearly every car maker recommends Energol. The boss uses it in his own car. Our Energol customers say they get easy starting summer or winter with Energol, and we don't often see their cars in for repairs. Every time I'd say you should use **ENERGOL THE OILIEST OIL** says the garage attendant.

Use **ENERGOL** motor oil



Recommended by Rolls Royce and all Leading Car Manufacturers
PRICE'S LUBRICANTS LIMITED

each package is strapped with the same uniform degree of tension.

The only demands made on the operator are that he places the package in the correct position in the tying ring and presses a foot pedal. The wire is automatically placed, tightened and sealed.

The machine is strongly built, self-contained and installed complete with electric motor and starter. Connection to the power supply is the only requirement for immediate operation.

—(Enquiry Ref. No. S.51/53.)

GAUGES AND TOOLS

Tapping with Drills

NOW available in this country is a Swiss device that enables any type of drilling machine to be adapted for tapping B.A. threads of any pitch, right or left handed, in metal or insulating material.

The thread tap is fitted with a double-drive friction cone clutch which automatically gives quick,

smooth reverse rotation when the direction of thrust is changed. The device measures only $3\frac{1}{2}$ by $1\frac{1}{2}$ in. and weighs but 9oz.

Taps are available for threading holes between 14 and 7 B.A. in steel and up to 5 B.A. in brass. A Morse cone is normally sup-



With this attachment B.A. threads can be tapped with any drill.

plied with the device, but other types are available if required. The tapper can be run at speeds up to 3,000 revs. per minute.

—(Enquiry Ref. No. S.51/57.)

Industrious Beaver

DESIGNED primarily for use in maintenance and repair departments the *Beaver* portable power hacksaw will cleanly and quickly cut ferrous or non-ferrous rounds, squares, flats, etc., up to $4\frac{1}{2}$ in. in diameter. The welded angle-steel construction gives adequate strength and rigidity without excessive bulkiness or weight. The 10 or 12 inch saw blade is supported between pillars which allow vertical movement; the whole assembly sliding on special bearings to give the reciprocating cutting motion.

A roller-top support stand makes the feeding of long lengths of material to the saw a simple matter.

Wear on the blade is reduced because it is held clear of the work



There's a Fresh air
about the office now
(14,000 cu ft of it per hour)

Easily installed — Quiet operation
Consumption only 25 watts

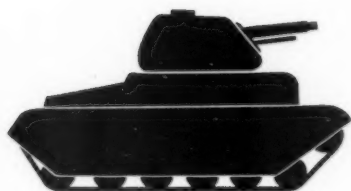
Xpelair carries a
National Physical Laboratory
Certificate
confirming its performance

XPELAIR
WINDOW FAN

A G.E.C. PRODUCT

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2.

whether
you
make



or



It seems ridiculous — and expensive — to use half a dozen different brands of paint brush in your "Works" when one brand, Harris, will do very well. For painting there is no higher quality brush than the Harris Super. For the many other industrial jobs — daubing oil on machine parts, dusting, cleaning, etc. — for which you need paint brushes, you will find in the wide Harris range one to suit each job. A paint brush *with bristles that won't come out.*

See your local stockist. Or write direct to us: L. G. Harris & Co. Ltd., Stoke Prior, Worcs. You'll find the difference in bulk buying *one* brand from *one* source is quite appreciable.

you have many
uses for



Harris—THE PAINT BRUSH WITH A NAME TO ITS HANDLE

CRC 121



A new portable power hacksaw.

on the return stroke; varying the blade tension also varies the rate of fall of the cutting head.

—(Enquiry Ref. No. S.51/54.)

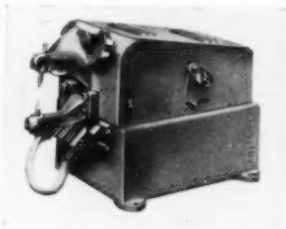
Precision Spot Welder

THE Heathway $\frac{1}{2}$ K.V.A. spot welder has been designed for accurate, small scale work on instruments, radio components, etc. The welder is constructed in two

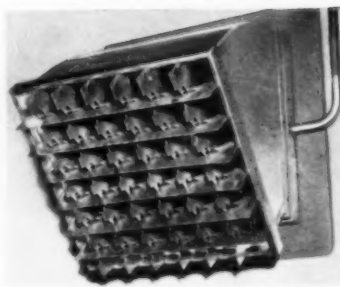
halves: a box base contains the transformer and tappings; the control mechanism, leads, controls and electrode arms are incorporated in the top half.

Cast bronze arms hold the 5/16in. diameter electrodes in either a vertical or horizontal position. A lamp built into the mechanism housing serves a dual purpose; it illuminates the work and also serves as a mains indicator. Controls are provided for varying the welding pressure and voltage.

The welder is operated by a foot pedal and the dimensions of the



This new spot welder is designed for accurate small scale work.



A Colt wall inflow unit mounted to give a downward air current.

machine are 14in. by 9in. by 10in.; the weight is 60lb.

—(Enquiry Ref. No. S.51/50.)

VENTILATION

Directional Air Supply.

A NEW wall inflow unit can be mounted in various positions to give a close control of the direction of the air supply. Variable angle blades on the impellor increase this control still further.

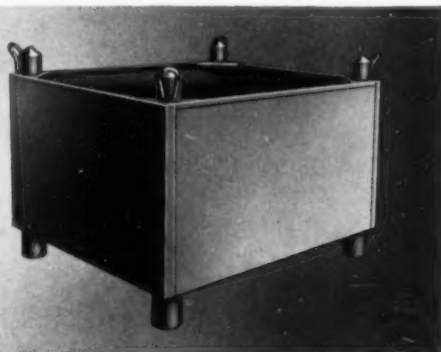
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with 15in blades that deliver 2,100 cu. ft. of air a minute. Smaller units for use in offices, hospitals, etc., have an output of 1,400 or 1,000 cu. ft. per min. and lower fan speeds. Regulating switches can be fitted to any of the units so that the air volume and velocity can be varied at will.

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—(Enquiry Ref. No. S.51/56.)

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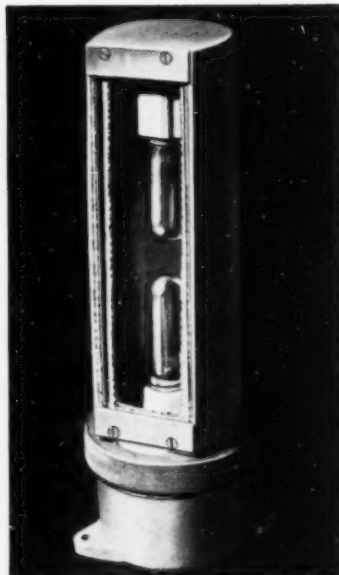
for other special applications in fume, dust or steam laden atmospheres.

The *Metrovick* has a cast iron or silicon aluminium conduit box with lugs for 5/16in. Whitworth bolts. A re-inforcing boss tapped ¾in. conduit on the side of the box ensures a vapour tight conduit entry to the terminal block in the casting.

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The lamp housing is a cast iron or silicon aluminium cylinder with a recessed heat resisting glass panel. A packing ring ensures a vapour-tight joint when the housing is screwed to the box by the knurled retaining collar. The unit has an overall height of 12½in., by 3½in. diameter.

—(Enquiry Ref. No. S.51/42.)



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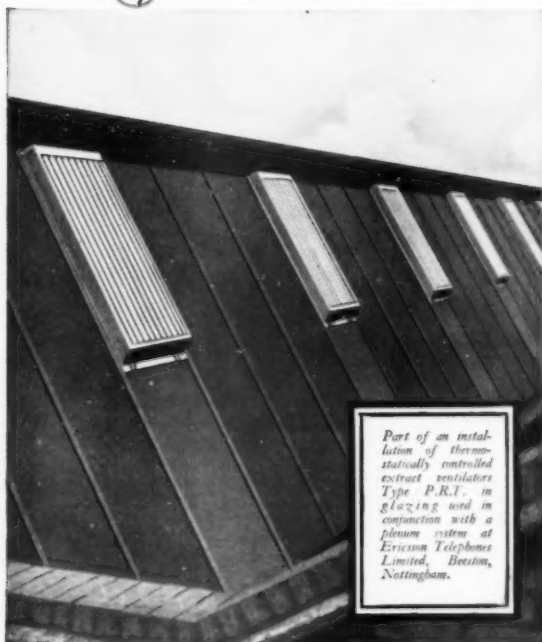
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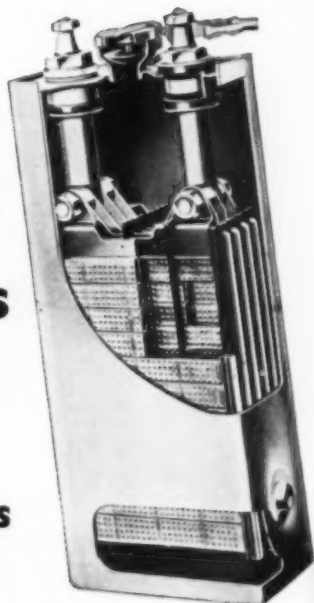
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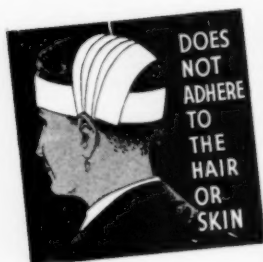
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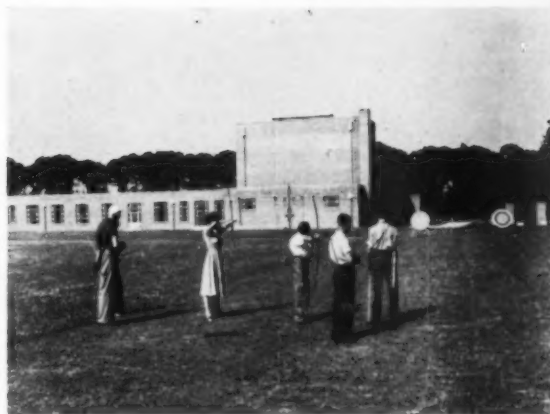


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Making it a Job for Life

By PAUL NUGAT

To work in Esso's new refinery at Fawley means a well paid job; but because of the peculiarities of the industry, monetary incentives for high production or long hours cannot be applied. Instead, there is a comprehensive welfare plan, embracing everything from a pension scheme to archery.



Archery: one of the sports available to Esso workers.

IN the next three years, the new Esso refinery at Fawley must increase its labour force from under 1,000 to about 2,200. For top management, this is no easy task. Fawley is a village some 16 miles from Southampton. It is very charming, but it has no amenities. Work in the refinery itself is well paid but offers no incentives in the form of extra money for high production or long hours.

Esso's answer to the problem is a comprehensive welfare policy which includes pension schemes, sickness benefits, further education, a "Coin Your Ideas" scheme, a fine new canteen, and many social facilities. There is something unusual about most aspects of their policy, as the following details will show.

Pension Scheme

The pension scheme was started

with a "prior service credit," the effect of which was to credit every employee with two per cent. of his total earnings over the last five years. Thereafter, discounting the first £100 of his earnings to cover insurances, etc., he gets:

- 3 per cent. on £200
- 4 per cent. on £300
- 5 per cent. on £400

so that an employee with £500 a year is entitled to a credit of £17 annually. On retirement he will receive a two per cent. bonus based on the average of his total earnings during the whole length of his employment, in addition to a pension rising to a maximum of two-thirds of the salary being earned at the time of retiring.

Should an employee die before retiring age, his wife gets 50 per cent. of her husband's pension bonus. Furthermore, if a man dies at 35 after only six months em-

ployment, two assumptions are made. First, that he would have continued to work for the firm for another 30 years and thus would have qualified for the maximum pension at his salary grade. Secondly, that in the course of those 30 years, his salary would have risen to £X. If, for example, his earnings would have amounted to £500 a year, he would have been entitled to 66 per cent. of £400, and his widow would therefore get 30 per cent. of £400 for the rest of her life.

Sickness benefit is also calculated on length of service, as follows:

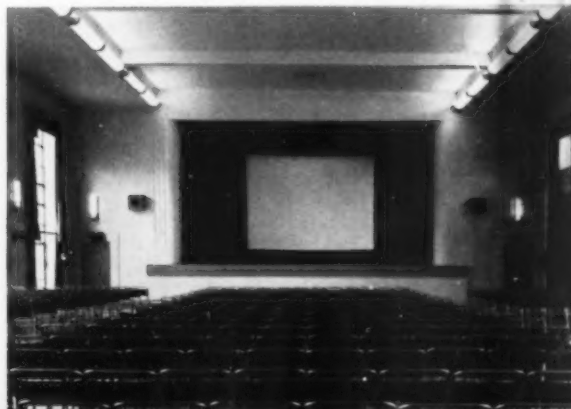
Length of employment	Full Pay	Half Pay
Under 6 mths.	1 wk.	2 wks.
Over 4 yrs.	9 wks.	11 wks.
Over 10 yrs.	13 wks.	39 wks.

Intermediate periods of employment are graded correspondingly;

The bowling green and the social club.



Inside the cinema which holds 450 people.



generally, management concede extra time on full and half pay to employees of 10 years standing.

Coin Your Ideas

"Coin Your Ideas" is the excellent and unusual name given to Esso's suggestion scheme. This works as follows: when a member of the staff wishes to submit an idea (which can be technical or non-technical), he gets a form from the employer relations manager. Instead of including his name the form is given a number. Then it goes to the standing committee appointed to examine all suggestions. Anonymity of the form ensures unbiased judgement, and the promoter has no "come back" if the idea is not accepted. If a suggestion is adopted, the promoter gets a down payment of £2 10s. At the end of its first year of operation, the management credits him with a varying percentage of the money saved by the idea. The popularity of the scheme can be judged from last year's submissions—100 ideas per 1,000 employees. One employee received £45; another, £30.

WHAT ESSO PROVIDES WELFARE

- Pension Scheme
- Sickness Benefits
- Suggestions Scheme
- Further Education
- Canteen

SOCIAL

- Social Club
- Cinema
- Sports Club

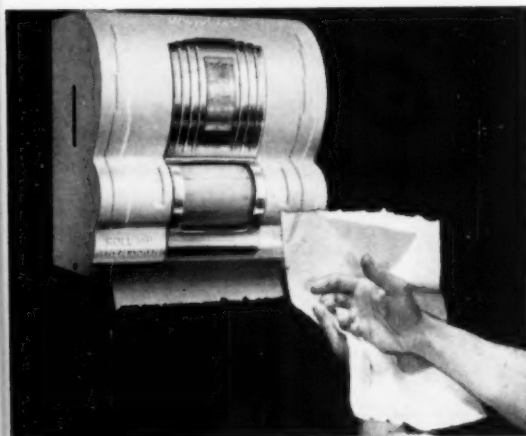
The Canteen

The canteen is only just going into operation—for reasons which are somewhat unusual. Until recently, management's experience of industrial catering was limited to

running a small hostel which served only 270 meals a day. The new canteen, however, was planned to feed 450 people at a time. The management therefore decided to gain wider experience by providing canteen facilities on the construction site for the employees of their numerous contractors.

A catering contractor was brought in to staff this canteen and to make the bulk purchase of food as Esso's representative—not on his own behalf. In this way management learnt how to provide 2,000 meals a day at 1/3d. to 1/9d. and a further 1,000 to 1,500 light meals. A full time baker has been working on the site, turning out 6,000 bread rolls, cakes and buns and another 4,000 jam tarts and pieces of confectionery every day. Most of this, together with 800 gallons of tea, is being distributed three times daily by vans at some 19 selling points on the 450 acre site.

Breakages of crockery have been calculated at nearly three per cent. of cost of turnover, and some



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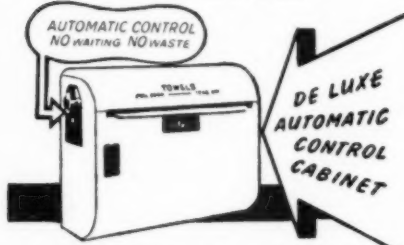
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Miss Jones, have we moved to the country?

No, Mr. Perkins.

Then perhaps the country has moved to us?

Not that I know of, Mr. Perkins.

Strange! I could have sworn I caught a breath of real
fresh air, the kind that blows off the sea across fields of
new-mown hay.

It's the Walter Ozoniser, Mr. Perkins—that little box
thing on the wall. Mr. Bones says it makes ozone from
oxygen, and in doing so it destroys the particles of
matter which make the air stale and stuffy.

Really, Miss Jones?

Yes, Mr. Perkins. Mr. Bones says it will last for years
without replacements, and help us to work harder.

Ah, I might have known old Boney would have an ulterior
motive.

Walter Ozoniser Single Unit (up to 4,000 cu. ft.) £6.4.0.
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2,500 sets of cutlery "disappeared" within three months. From this and similar data the management have been able to calculate the likely cost of running their own staff canteen. Of equal importance is the opportunity provided to observe the efficiency of kitchen equipment, its layout, the technique of serving meals in the cafeteria style, and the size of the canteen staff needed to cope with the work. In short, Esso are buying their experience in the cheapest and most efficient way imaginable.

Further Education

Further education is being encouraged under an educational refund plan. An employee who takes a course of study which is of direct benefit to the company, whether it is at an evening institute or is done by correspondence, will have two thirds of his expenses refunded on the successful completion of his studies.

The rest of the story is equally impressive, but it can only be told in brief. Space permits no more



Not at the "local" but inside the Esso social club.

than a reference to the fact that priority has been given to building a cinema that will seat 450 people; a social club with three full size billiard tables, lounges, a tea bar, a fully licensed bar, etc.; and a sports club that will add

cricket, tennis, bowls, rugby, soccer, hockey to the facilities for archery, sailing and shooting.

Oil refining is generally regarded as offering steady employment. Down at Fawey, Esso mean to make it a job for life.

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Catering for 11,000 staff—many of whom work irregular hours—in big and small centres all over the country is a complex business. But that is the problem of the B.B.C.'s catering department and this article explains how they solve it.

Catering for Large and Small Groups of Shift Workers

By **BRIAN CUMMINGS**

IT seems that broadcasting is a hungry business. The B.B.C. employs 11,000 people, not counting artists, orchestras, bands, housewives, celebrities and many others who take part in programmes. All these folk have to be fed—a simple fact which presents one of the most complex problems in non-commercial catering.

Last year more than five million meals were consumed in B.B.C. premises. Some were taken at big centres like Broadcasting House; others were served at small transmitter stations in the heart of the country. Everywhere, the standards were high and the prices were surprisingly low.

The Head of Catering at the B.B.C. is Miss Nan Robinson, who believes that appetizing, nourishing and well-presented food can be prepared on a large scale. She achieves this economically by an ingenious policy of combining standard meals with a *la carte* service.

A standard meal of meat, two vegetables and sweet costs only 1/6d.—no matter whether it is served in the London area, the regions, or at transmitter stations. This is a price which is barely sufficient to cover all costs, so that any difference has to be recovered on meals which are bought a *la carte*. These may cost anything

from 10d. to 4/6d., according to taste and pocket.

The standard meal is of course varied from day to day and place to place. A sample menu gives stuffed breast of lamb, cabbage and boiled potatoes, with steamed jam roll and custard, all for 1/6d. This type of meal is often just as popular with hard-pressed middle-class executives as it is with studio attendants and manual workers. Not always, however, or the system would not pay! A recent check showed that in London only 25 per cent of main meals served were standard meals. In the regions the percentage was 48. Transmitters do not come into the picture because they must rely almost entirely on the standard meal.

A La Carte Menu

The sample menu also listed many attractive dishes *a la carte*. These included roast pork, stuffing, apple sauce and roast potatoes at 2/—, roast mutton, onion sauce and potatoes at 1/6d., corned beef curry, rice and chutney at 1/3d., and no fewer than nine different sweets at prices ranging from 4d. to 7d. *A la carte* menus outside the big centres are not quite so extensive, and small variations in

price are allowed to meet local conditions.

All employees of the B.B.C. are entitled to use the restaurants and tea bars and there are no special arrangements for different grades. The cafeteria principle is applied throughout, the only exception being an "approved tray service" which is used where the restaurant service is limited by local conditions, or people are kept in their offices by work.

The emphasis here is on "approval": you cannot have a tray simply by asking for it, and your request has to be passed by the head of your department. To the obvious reasons for this precaution can be added the fact that there is no extra charge for the service.

Apart from entertainment of visitors (which is charged to the department concerned), the only other truly uneconomic job which the catering department does is to provide meals for staff and artists working on rehearsals and transmissions. These occur at all hours of the day and night and may involve heavy labour charges to the catering department. They are the only labour charges which are subsidized.

Since it would be unfair to pass them on to the consumers, these charges merely serve as another

incentive for keeping the whole department on the straight and narrow path of economy. B.B.C. catering establishments are given their premises and their light, heat and capital equipment, but after that they are expected to pay their way. "The accounting system is foolproof," says Miss Robinson. "I know to Id. what was spent in each canteen last week."

There is, of course, an annual budget. After this each manageress is given weekly and quarterly targets for cash sales, food costs, wages and replacements. At all times she works to this slogan, which appears on the returns to area superintendents and the head of the catering department: "Watch your target turnover. Your food and wages allowances are strictly related to this turnover target."

Miss Robinson is responsible to Sir Norman Bottomley, the Director of Administration. Her immediate staff consists of a Catering Manager, a Senior Assistant, an Establishment Officer, four Area Superintendents and a

B.B.C. Catering — Four Point Policy

- 1 Both standard meals and an a la carte service are provided. Higher prices of the latter offset low cost of the standard meal.
- 2 Cafeteria principle is used throughout, the only exception being a tray service.
- 3 Premises, light, heat and capital equipment are provided "free," but after that the canteens are expected to pay their way.
- 4 Each manageress gets weekly and quarterly targets for cash sales, food costs, wages and replacements.

Stores Superintendent. Together, these nine people are responsible for a catering service employing a staff of 650 working in 60 establishments all over the country.

Capital equipment is bought by the engineering department. In London, food is acquired by the buying department; in the regions, manageresses are responsible. The

engineering and buying departments are general departments working for the whole of the B.B.C. On questions of construction and maintenance the building and engineering departments work in co-operation with the Catering Manager. He is also responsible for general purchases, planning of catering premises and con-

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trolling all supplies up to the point of service.

The Senior Assistant deals with costs, prices, and the quality and presentation of food. He is, in fact, a service manager. The four Superintendents move about the country at will, each being responsible for one area. Their job is to see that standards set are maintained, and in general, smooth the path of the manageresses. The one thing they must not do is stand between the manageresses and the head of the catering department.

Catering staff are able to qualify for holidays, sick pay and pensions in the same way as other employees of the Corporation. The job of the Catering Establishment Officer, therefore, is to administer the staff policy of the Corporation in line with catering requirements. Here the B.B.C. shows itself to be more progressive than industrial concerns which do not "recognise" canteen staff.

Relations between catering and customers are handled by a series of advisory committees. The central body is the Catering Joint Advisory Committee whose chairman is the Controller of Staff. Each region and each big establishment (such as Broadcasting House) has its own committee, the chairman being appointed by the management.

Members of the central body include the Head of Welfare, a representative of the Staff Association, and the Head of Catering. Elsewhere, the catering side is represented by the manageress.

Of all the things that are said about the Catering Department of the B.B.C., nothing pleases Miss Robinson and her staff more than praise for their arrangements for the "back room boys"—the engineers and technicians who maintain the service of the Corporation.

"Motherly" cooks are chosen for these stations—women who will look after the particular needs of each man. They get the best equipment and the finest food available within the limits of rationing. It's one way the B.B.C. have of thanking men who do a lonely job and do it well.



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How Cadbury's Control Overseas Subsidiaries

Continued from page 57

each of the subsidiaries. Samples of finished products are sent to Britain at least once a month, while the dispatch of partially manufactured samples allows a check to be kept on those processes which depend on human skill and judgement. Over a period, an overseas factory sometimes tends to wander gradually from the standard, and in order to determine the reason it may be necessary to analyse the partially manufactured product. Nowadays, samples are dispatched by air mail, thus avoiding deterioration during shipment through the tropics.

Standards of quality are controlled overseas by the same methods of inspection that are used by the parent company.

Since wrapping papers of unsatisfactory quality are liable to taint chocolate, a careful check must be kept on packaging materials used overseas. So far as design is concerned, the packings of the main Cadbury and Fry products are standardized throughout the world, with certain exceptions to suit local demands.

While the parent company insists that the basic products manufactured overseas must conform as far as possible to the home standards, no objection is raised if an overseas factory wishes to develop an additional line intended purely for the local market. No competition exists between the parent company and its overseas factories, which are assisted to develop export markets in adjacent territories.

The development of production overseas may be less satisfactory from the national standpoint than the export of home products, but Cadbury's—like other firms—have found that it is often the only alternative to a complete loss of trade and goodwill. To-day, relief from double taxation has removed one of the principal objections to the more widespread adoption of this very logical solution to the problem of protective duties.

QUALITY CONTROL

Continued from page 50

that all variation between the control limits should be ignored and that the overall level is given by the average personnel required for replacement each month but peak demands may rise as high as the upper control limit.

Forecasting Trends

Management is interested in the early detection of real changes from the average, either an improvement or a deterioration. This is rather difficult to achieve from single observations, especially if it is desired not to take action unnecessarily when the variation could reasonably occur by chance. Greater sensitivity to change can be obtained by combining the results of a few months' figures in sequence (if monthly figures are normally available). This is conveniently done by drawing extra control limits closer to the average such that two points in succession beyond them is indicative of a change. If desired, further control limits can be drawn even closer to the average corresponding to the results of three, four or even more points in succession.

Control charts have been used in a similar manner for many other management indices involving costs, machine utilization, productivity, quality, product life, etc., and for investigating the accuracy with which the quality of a complicated product, made in single units such as a power transformer, compares with its designed value. In a similar manner the technique has recently been used to illustrate differences in the level and consistency of the ratings of time study observers, who took part in a pilot experiment on time study rating.

The sales programme of a large firm manufacturing electrical domestic appliances has also been subjected to a similar treatment. Here, it was found that there were large seasonal fluctuations but the pattern was repeated each year. On fitting a regression line to the orders received in terms of the



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month of the year, it was found that the variation about the line was stable. Control limits were then calculated to determine whether any action was necessary to increase or decrease the incoming orders to maintain the expected sales. By these means, it was possible to plan the factory output over the whole year and avoid dismissing workers in the slack period and trying to recover them as winter approached, with overtime during the busy months.

The main reason for the more rapid expansion of quality control in the U.S.A. resides in the outlook of management there. They have learned to balance the value of quality against the cost of quality and hence they require means of accurately assessing the quality they achieve. This has led to the new professional status of quality control engineers, who invariably show the actual financial savings that have accrued by their efforts. Nothing succeeds like success, and what one firm can do, so can another. The more progressive attitude in the U.S.A. has meant that one successful application has been followed by others. In Great Britain, however there is a tendency for managements to accept quality control in principle, but to believe its application impracticable for their particular industries. Too often it is stated that savings are due to other causes, forgetting that quality control was the light which illuminated the problem.

At least one British firm is tackling the problem in a realistic manner. It has recently appointed a new head to its inspection department with the title of chief quality engineer. Prior to taking up his duties, he visited the U.S.A. and saw the operation of quality control there. He is convinced of its usefulness in his own firm and is now organizing his department in two sections, viz., quality control and quality assurance. As the former becomes better established, the work of the latter will diminish and be incorporated in quality control, using the wider definition than is usual in Great Britain.

HOW TO RAISE CAPITAL

Continued from page 43

gives an order for, say £10,000 worth of goods to firm B, to be paid for on delivery in nine months time. B thereupon instructs A, on a special form (the Bill of Exchange) to pay £10,000 in nine months time to a finance company, C, and send this bill to C. C investigates the *bona fides* of A (if they do not already know them), and accept the bill, endorsing it to this effect and returning it to B. By doing so, they accept responsibility for seeing that A will, in due course, meet their commitments.

B can then take the accepted bill to his own bank, or to a finance company, which will gladly advance the entire sum mentioned in the bill, less a small discount, which may be as little as three per cent. per annum. The bank may never have heard of the firm, A, that gave the order and promises to pay on delivery; the fact that the bill is guaranteed by a known finance company of undoubted integrity is sufficient guarantee that it will be met.

Revolving Credit

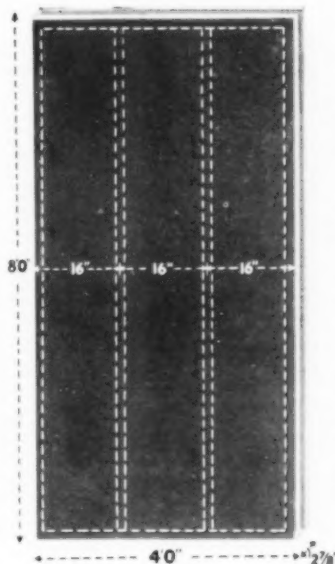
There are two main types of bill, the first covering specific transactions, such as that described, the other the "revolving credit." In the latter case, new bills will always be drawn as others fall due, provided that the finance company is satisfied that there is a continuing volume of suitable business to justify the bills outstanding. This procedure results in the maintenance of a constant level of finance up to an agreed amount. It is in effect "accommodation" finance of the same type as the long-term overdraft, and is subject to the same dangers. Unless very wisely used, it may become a noose around the neck of the young firm.

A bill of exchange may be used by a merchant to finance purchases to be sold on varying credit terms.

Continued on next page

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Above: A typical 'K' Panel.

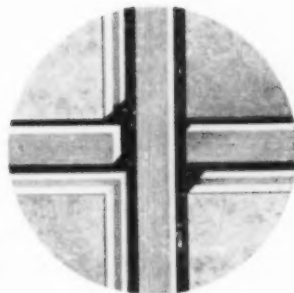
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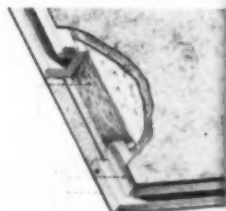
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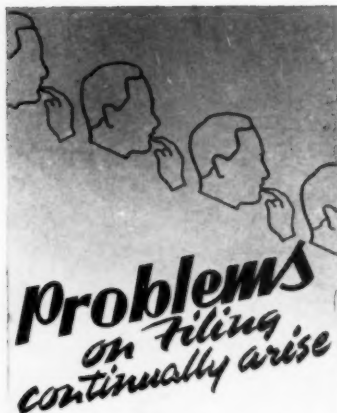
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HOW TO RAISE CAPITAL

Continued from previous page

It is usually suitable for a manufacturer buying raw materials, where the proceeds of sale of the manufactured goods will be available to meet the bill when it matures. The most desirable form of transaction is one which is completed within the period of one bill, say three months. Finance companies are, however, always prepared to consider business running into longer periods, providing the transaction is of a self-liquidating character; for instance one very common type of transaction is the purchase of produce at harvest-time to be disposed of gradually during the ensuing winter and spring.

Death Duties

DEMANDS for working capital can thus be met by the banks and finance companies; there is, however, one occasion on which a business may find a sudden need for temporary capital which none of these sources can satisfy—the need for money to pay death duties on the demise of a director or partner.

Not all business men realise that death duties must be paid, in cash, not merely on the liquid assets of the man who has died, but on his whole estate, including any shares he may hold. The punitive rate of death duties currently in force means more often than not, that some, if not all, of the deceased's shares must be sold to pay the duties. If they consist of shares in a large public company, the effect on the business may not be appreciable. If they represent a shareholding in a small private concern, however, the effect is always serious and may be disastrous.

The only method by which death duties may be avoided altogether is by a free gift of the property, and then only if the gift occurs five years before the donor's death, which makes this a somewhat risky step. They can be reduced in some

cases by the formation of a trust, but this is a step demanding expert legal aid, and consequently fairly heavy legal charges; it is only justified where the estate is likely to be considerable.

The impact of death duties on a small concern can, however be mitigated by a simple insurance. Under present conditions, the amount that will be demanded in death duties on a particular asset, such as a parcel of shares, can be calculated with fair accuracy in advance. It is therefore perfectly simple for a firm to take out an ordinary life assurance policy on the life of the chairman or managing director which will provide that, on his death, his estate shall receive the equivalent sum in cash, and thus be in a position to pay off the death duties without having to market the shares. These then pass intact to the person named in the director's will, and continuity of management is ensured.

Premiums will naturally vary according to the man's age and state of health; they may be paid by the firm (though they are not an allowable charge for taxation purposes) or by the individual director. In most cases, it is more usual for the director to pay the premiums himself, since he can offset personal allowances against them for income tax purposes, which the firm cannot do.

Key Men Covered

It is, of course, not necessary that the payment should be limited to the exact sum required for death duties or even to directors; some firms are already insuring all their key personnel in order to recover not merely the losses of death duties but the additional losses inevitable when an experienced executive is replaced by a comparatively inexperienced one.

At worst, taking out an insurance policy is a method of paying death duties by instalments, and so spreading the load. At best, it enables a firm to survive the sudden and unexpected death of one or more of its key executives with a minimum of shock.

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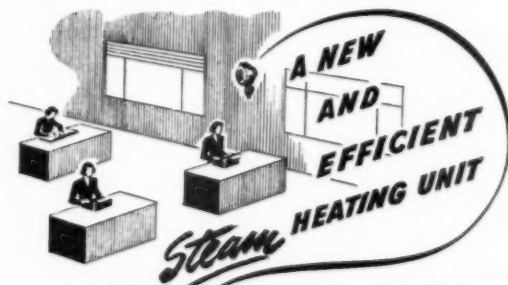
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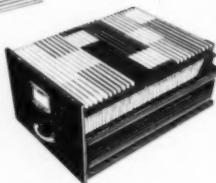


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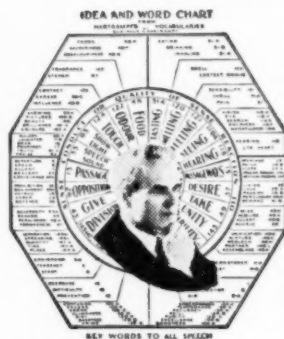
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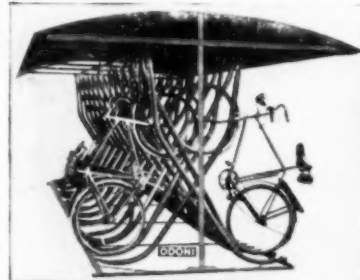
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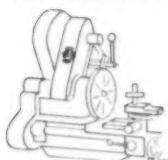
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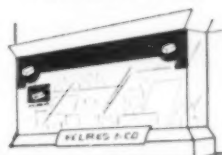
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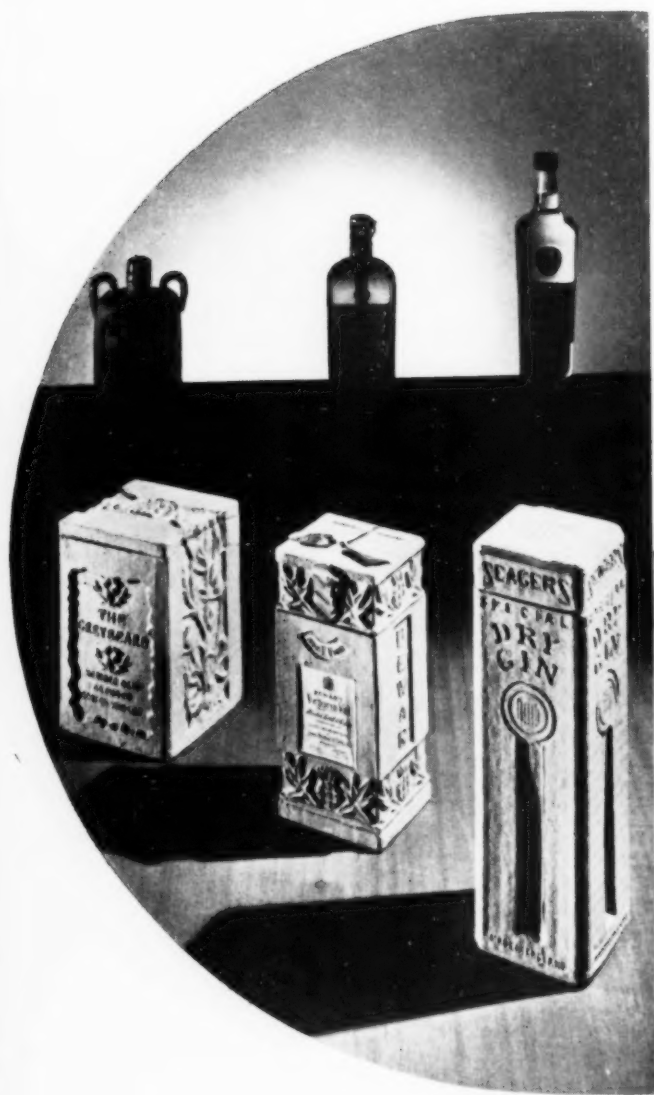
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